HARMONY

Harmony™ Test System User Manual

Copyright © 2020 Teledyne LeCroy, Inc.

Frontline is a registered trademark of Teledyne LeCroy, Inc.

Harmony, *conformance*Harmony, *test*Harmony, X240 and Sodera are trademarks of Teledyne LeCroy, Inc.

The Bluetooth SIG, Inc. owns the Bluetooth® word mark and logos, and any use of such marks by Teledyne LeCroy, Inc. is under license.

All other trademarks and registered trademarks are property of their respective owners.

Table of Contents

What is in this manual

The Frontline Harmony Test System User Manual comprises the following chapters, which are organized in the sequence you would normally follow to perform validation testing: set up, configure, test, report. You can read them from beginning to end to gain a complete understanding of how to use the Frontline Harmony hardware and software or you can skip around if you only need a refresher on a particular topic. Use the Contents, Index, and Glossary to find the location of particular topics.

- Chapter 1. Frontline Hardware and Software. This chapter will describe the minimum computer requirements, how to install the software and license key, and how firmware updates are provided.
- Chapter 2. Getting Started. Here we describe how to set up and connect the hardware, and how to apply power. This chapter also describes how to start the Frontline Harmony software.
- Chapter 3. Configuration Settings. The software is configured to capture data. Configuration settings may vary depending on the user's pc configuration and the implementation under test (IUT).
- Chapter 4. Running Tests. This chapter describes how to run one or more validation tests.
- Chapter 5. Test Results. Here you will find how to view results, export reports, and use the files stored in the Results folder.
- Chapter 6. General Information. This chapter provides additional information about the troubleshooting failed tests with Frontline Sodera, and also provides information on how to contact Frontline's Technical Support team should you need assistance.
- Chapter 7. *test*Harmony. This chapter describes the additional features that are available with a *test*Harmony license.

Important note: The Harmony Test System includes a Frontline Sodera or X240 unit. Other Sodera or X240 units can be used with the Harmony hardware, however the Sodera *must* have either a Dual Mode Advance license or a Single Mode LE Advance license and the X240 must have a LE license to work correctly with the system. For the Sodera please use the "Renew PM" application to check your license type. For the X240 run Wireless Protocol Suite, on the Main Page click the down arrow next to the X240 serial number on the Analyzer bar and click Manage License to check your license type. The Sodera or X240 unit you received with the Harmony Test System is ensured to work correctly when used in tandem with your system's Harmony hardware.

Chapter 1. Frontline Hardware & Software

The Frontline Harmony hardware interfaces with your computer that is running the Harmony software.

Frontline Harmony Test System is an easy to use and powerful tool to perform a wide variety of Bluetooth low energy HCI and link layer validation testing. The Harmony Test System is a set of integrated components, including the Frontline Harmony hardware; the Frontline Sodera Wideband Bluetooth Protocol Analyzer or X240; and the Harmony software.

This manual is a user guide that takes you from connecting and setting up the hardware through all of the Frontline Harmony software functions for your Frontline hardware. Should you have any questions contact the Frontline Technical Support Team.

1.1 Computer Minimum System Requirements

- Frontline supports the following computer systems configurations:
- Operating System: Windows 10
- USB Port: USB 2.0 High-Speed or or later
- The Frontline software must operate on a computer with the following minimum characteristics.
- Processor: Core i5 processor at 2.7 GHz
- RAM: 4 GB
- Free Hard Disk Space on C: drive: 20 GB

1.2 Software Installation

Depending on the license (there will only be one license file) the Harmony software will operate in *conformance*Harmony mode (which is the standard official testing software mode), *test*Harmony mode, or both. Harmony will only operate in one of the modes at a time and which mode Harmony is in can be seen in the top left corner.
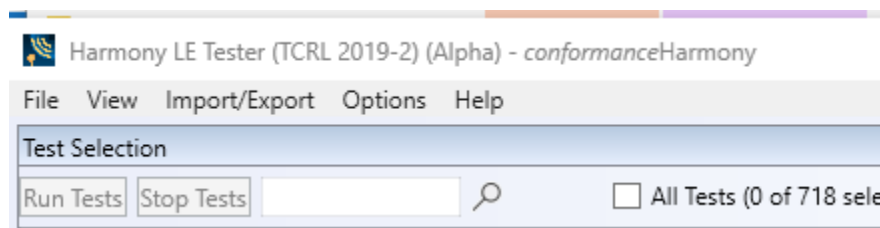
Figure 1.1 – *conformance*Harmony Mode

The *test*Harmony mode has two new features. One feature is the ability to run tests without the Sodera or X240. If this feature is used any test that requires a Sodera or X240 and passes will have a Final Verdict of Manual. The other new feature is the ability to run a test an infinite number of times.

The *test*Harmony license will be tied to features and only tests that are tied to those features will be displayed. For example, if a testHarmony license only has HCI and 2M LE PHY then only HCI and 2M LE PHY test cases will be available in *test*Harmony mode. If the license has both *conformance*Harmony and *test*Harmony then the user will be able to switch between the modes and if the user is in *conformance*Harmony mode all of features and tests will be available.
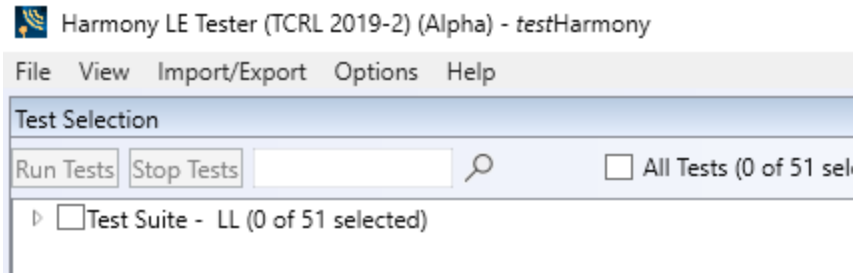
Figure 1.2 – *test*Harmony Mode

1.3 Harmony Firmware

The Harmony software will check the version of Harmony hardware firmware and determine if the firmware needs to be upgraded or downgraded. In order to perform the firmware check, the Sodera or X240 must be properly licensed. Please refer to the note above for licensing information. If the firmware needs to be changed a popup window like the one below will appear (Figure 1.3)
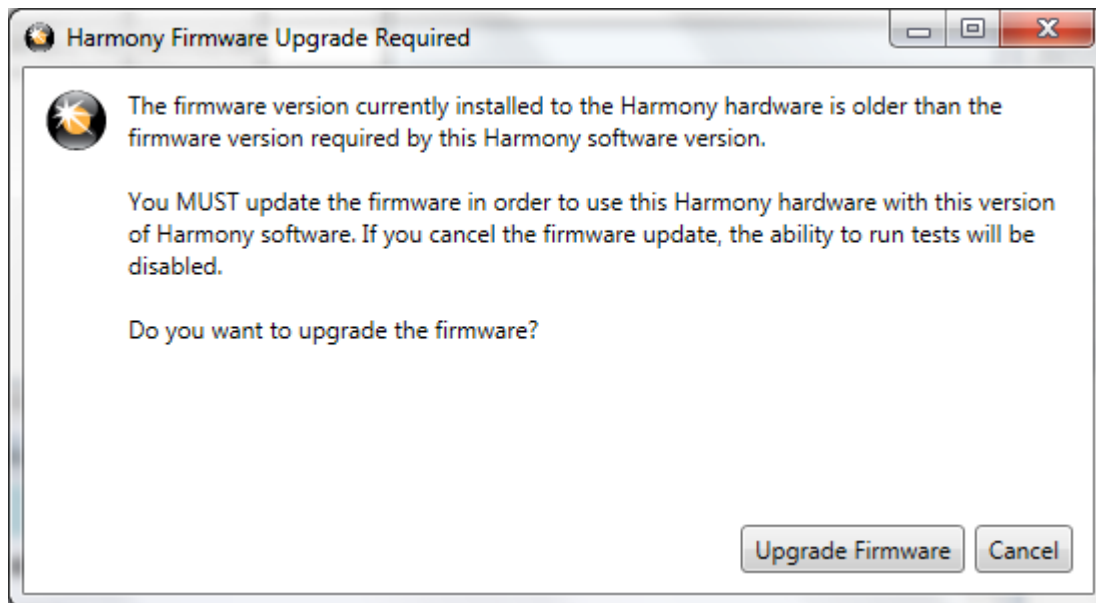
Figure 1.3 – Harmony Firmware Upgrade Notification

Follow the instructions in the popup window. Note: if the "Cancel" button is selected the firmware will not be changed and the tests will not be run until the firmware is correct. If the firmware was not changed when initially prompted one can change the firmware by going to Help > Update Harmony Firmware…

If the "Upgrade Firmware" button or "Downgrade Firmware" button is clicked, another popup window will open showing the progress of the firmware change (Figure 1.4). When the firmware change is complete click the "Close" button.
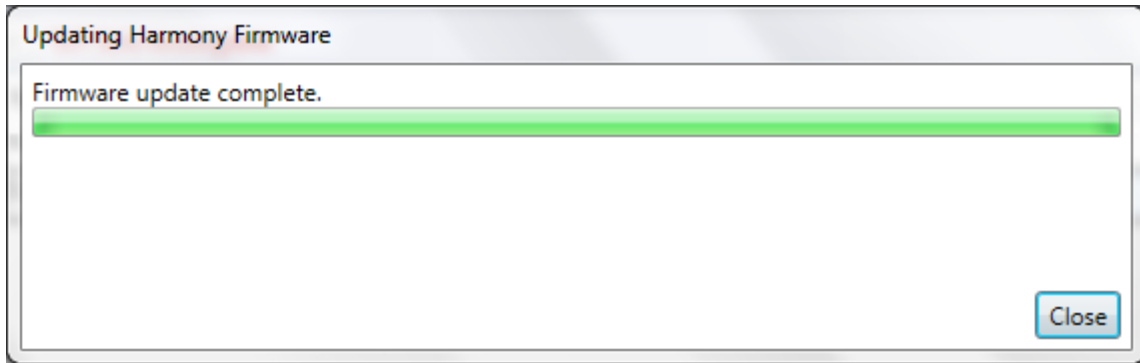
Figure 1.4 – Updating Harmony Firmware

1.4 Sodera or X240 Firmware

The Harmony software will check the version of Sodera or X240 hardware firmware and determine if the firmware needs to be upgraded or downgraded. If the firmware needs to be updated a popup window like the one below will appear (Figure 1.5).
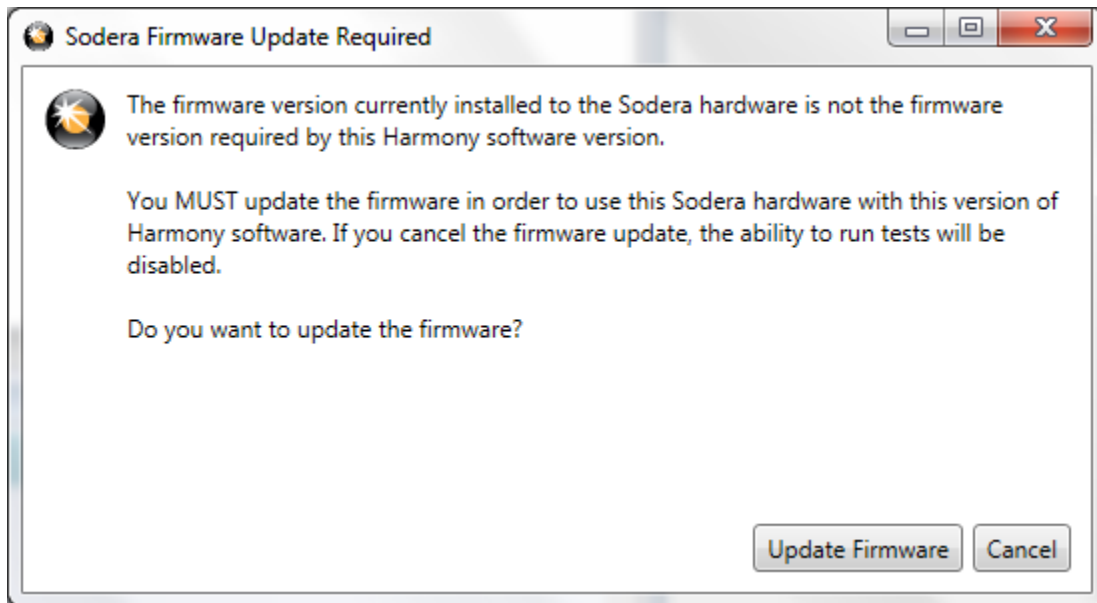
Figure 1.5 – Sodera Firmware Update Notification

Follow the instructions in the popup window. Note: if the "Cancel" button is selected the firmware will not be changed and the tests will not be run until the firmware is correct. If the firmware was not changed when initially prompted one can change the firmware by going to Help > Update Sodera Firmware… or Help > Update X240 Firmware…

If the "Update Firmware" button is clicked, another popup window will open showing the progress of the firmware change (Figure 1.6). When the firmware change is complete click the "Close" button.
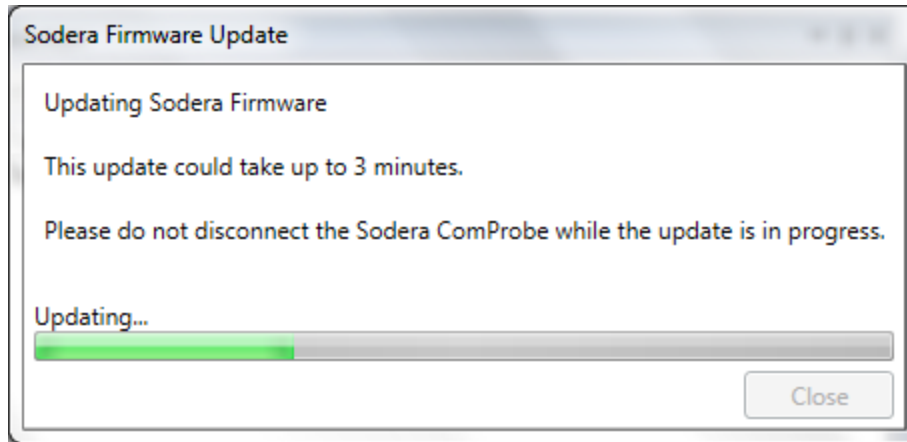
Figure 1.6 – Sodera Firmware Update in Progress

Chapter 2. Getting Started

In this chapter we introduce you to the Frontline Harmony hardware and show how to start the Frontline Harmony software and explain the basic software controls and features for conducting validation tests.

2.1 Harmony Hardware

2.1.1 Attaching Cables for Conductive Operation

Since over-the-air sniffing can be compromised in noisy RF environments, conductive testing is the recommended approach.

1. Attach one end of each of the three provided RF cables to the T-connector, also provided with your Harmony Test System (Figure 2.1).
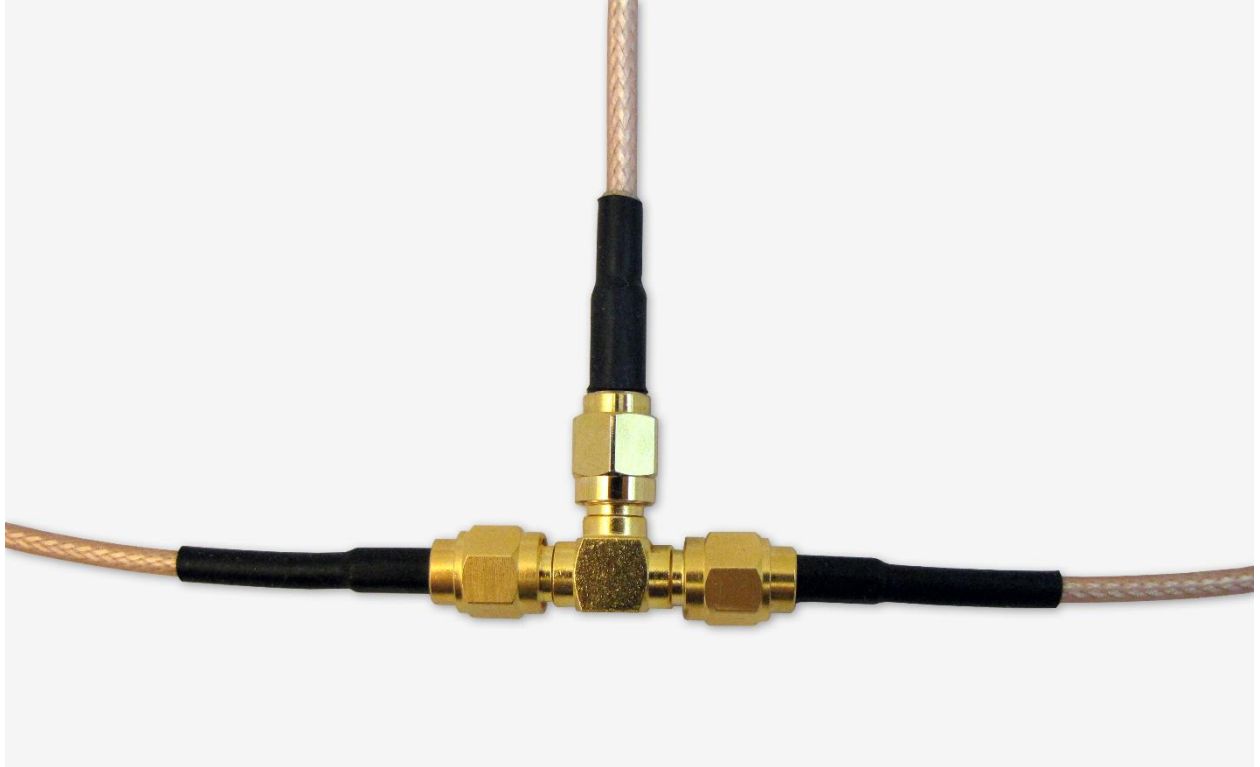
Figure 2.1 – RF Cables and T-Connector

2. To the other end of each RF cable, connect one of the three provided 20dB attenuators (Figure 2.2).

Figure 2.2 – RF Cable and Attenuator

3. Attach one cable-connected attenuator to the Antenna port of the Frontline Sodera hardware or the Antenna port (Rx 2) on the X240 hardware.
4. Attach one cable-connected attenuator to the Antenna port of the Frontline Sodera hardware.
5. Attach the last cable-connected attenuator to the RF output of the IUT.
   Important note: If the IUT's RF output isn't capacitively coupled, attach the provided DC blocker to the attenuator before connecting the attenuator to the RF output of the IUT (Figure 2.3). If you don't know whether the IUT's RF output is capacitively coupled, use of the DC blocker is recommended.

Figure 2.3 – DC Blocker Connection to Attenuator

2.1.2 Attaching Antenna for Over-the-Air Operation

Although conductive testing will yield the best results, over-the-air testing can provide good results when the testing is done in a controlled RF environment (e.g. an RF shielded room). If you choose to do over-the-air testing, attach the supplied antenna to the Harmony hardware.

1. Attach the antenna to the SMA connector jack under the "ANT" label. (Figure 2.4)

Figure 2.4 – Antenna Connection

2.1.3 Connecting/Powering the Frontline Harmony

Once you have readied the Harmony hardware for conductive or over-the-air testing, the next step is to power up and connect the Frontline Harmony to the computer.

1. Connect the provided 5VDC 1.2A adapter to the Power port on the Frontline Harmony back panel (Figure 2.5).

Figure 2.5 – Power Connection

2. Plug the adapter into the AC power source. The rear panel Power light will illuminate.
   Note: The Harmony hardware is designed to operate using only USB power in mobile settings, or when access to a wall outlet is unavailable. Powering your Harmony hardware using a wall outlet will provide more power to the USB ports.
3. Insert the supplied USB mini cable into the PC connection on the Frontline Harmony rear panel (Figure 2.6).

Figure 2.6 – PC Connection

4. Insert the other end of the USB cable into the PC.
5. Insert the supplied USB mini cable into the Port 1 connection on the Frontline Harmony rear panel (Figure 2.7). The second port is reserved for future use.

Figure 2.7 – IUT Port Connections

6. Plug the other end of the Port USB cable into the IUT.
7. Connect Frontline Sodera's PC Host port or X240's Host port to PC via USB (Figure 2.8)
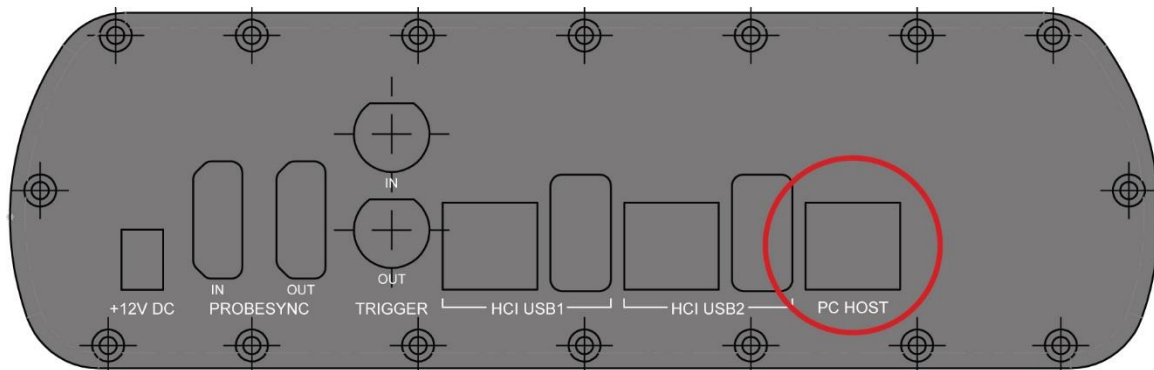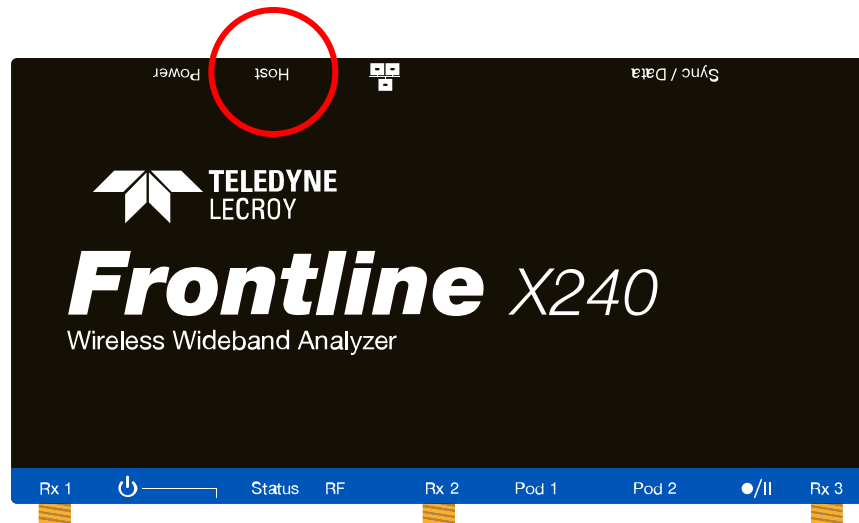
Figure 2.8 – Sodera or X240 PC Connection

Important note: The Harmony Test System includes a Frontline Sodera or X240 unit. Other Sodera or X240 units can be used with the Harmony hardware, however the Sodera *must* have either a Dual Mode Advance license or a Single Mode LE Advance license and the X240 must have a LE license to work correctly with the system. For the Sodera please use the "Renew PM" application to check your license type. For the X240 run Wireless Protocol Suite, on the Main Page click the down arrow next to the X240 serial number on the Analyzer bar and click Manage License to check your license type. The Sodera or X240 unit you received with the Harmony Test System is ensured to work correctly when used in tandem with your system's Harmony hardware.

8. After making these connections, your setup should resemble a typical testing configuration (Figure 2.9)
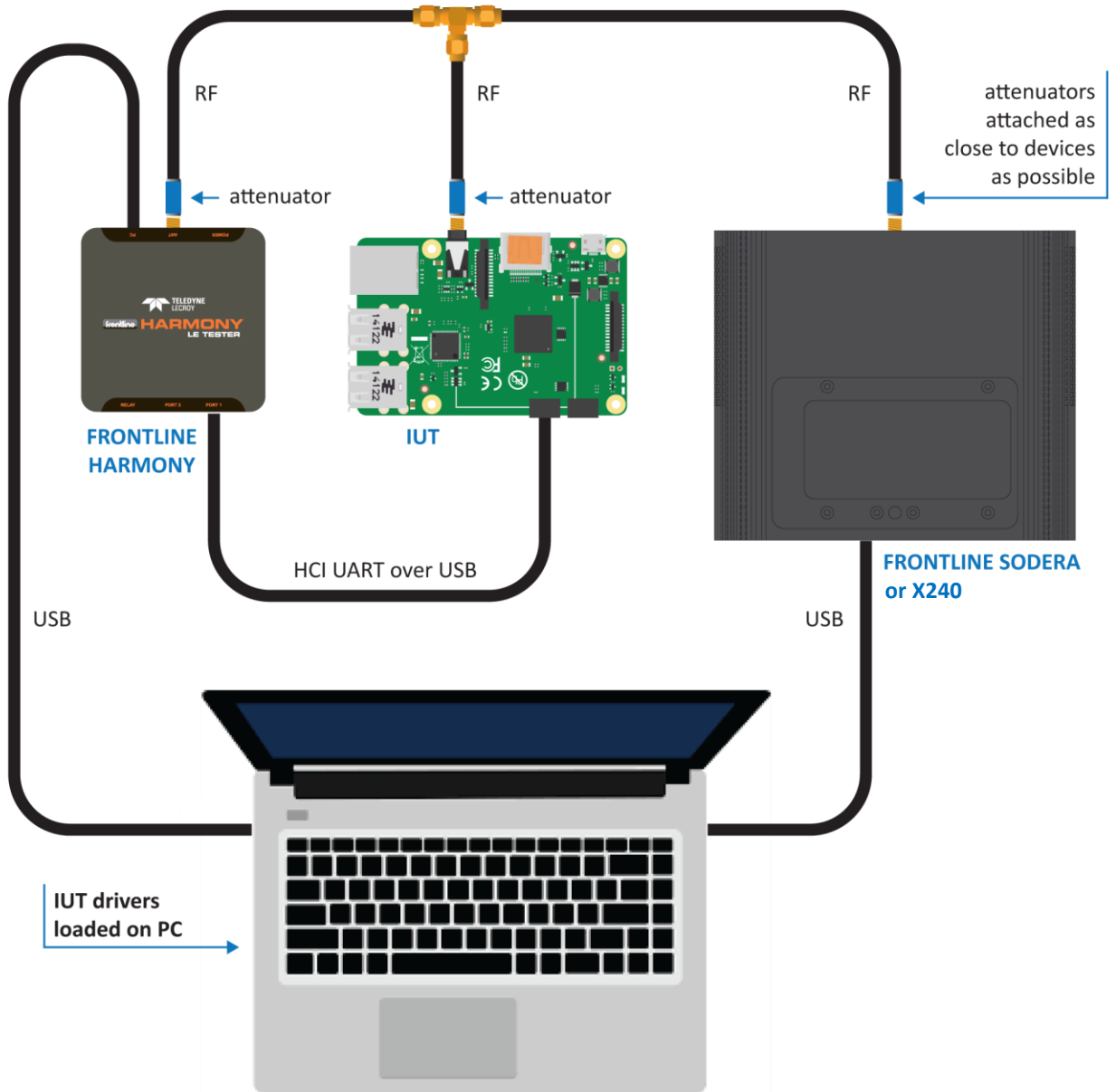
Figure 2.9 – Typical Testing Configuration

Figure 2.10 – Relay Connections

9. The relay (Figure 2.10) port is a solid state device used to externally control devices, like switches, triggers, etc.
    a. The center pin of the connector is Common (COM) and the other two pins are Normally Open (NO) and Normally Closed (NC).
    b. The relay provides a means by which users can reset their IUT between tests (e.g. by removing and then reapplying power to the IUT, or by asserting & releasing a reset line).

2.1.4 Manual Attenuation of Some PCL Tests

The following 20 tests require adding an attenuator:

LL/PCL/MAS/BV-03-C	LL/PCL/MAS/BV-04-C	LL/PCL/MAS/BV-05-C	LL/PCL/MAS/BV-12-C
LL/PCL/MAS/BV-17-C	LL/PCL/MAS/BV-20-C	LL/PCL/MAS/BV-23-C	LL/PCL/MAS/BV-45-C
LL/PCL/MAS/BV-47-C	LL/PCL/MAS/BV-48-C	LL/PCL/SLA/BV-03-C	LL/PCL/SLA/BV-04-C
LL/PCL/SLA/BV-05-C	LL/PCL/SLA/BV-12-C	LL/PCL/SLA/BV-17-C	LL/PCL/SLA/BV-20-C
LL/PCL/SLA/BV-22-C	LL/PCL/SLA/BV-45-C	LL/PCL/SLA/BV-47-C	LL/PCL/SLA/BV-48-C

These 20 text cases can be selected by clicking on "Options" > "Test Selection Manager" and scrolling down and selecting the "LE Power Control – Manual Attenuation Required" section.

The value of the attenuation varies based on the IUT's supported power range and is based on the following formulas:

- golden_range_midpoint = (TSPX_golden_range_lower + TSPX_golden_range_upper) / 2
- low_start_power = min(golden_range_midpoint, TSPX_golden_range_lower + 10)
- hi_start_power = max(golden_range_midpoint, TSPX_golden_range_upper - 10)
- attenuation = ((low_start_power + hi_start_power - 60) / 4) + 5

If the attenuation is not an integer value then round up (for example, if attenuation = 33.3 round up to 34). If a test fails add another 3 to 5 dB of attenuation.

Connect the attenuator(s) to the "ANT" port between the Harmony and the IUT as shown in the image below. It is not recommended to use the DC blocker while running these PCL test cases.

Figure 2.11 – Attenuator Connection

2.1.5 Launching the Software

Installing the Frontline Harmony software creates folders necessary for the operation of the software. After you've placed the "licenseKey.py" license key in the appropriate folder per section 1.3, you can launch the software using one of two methods.

1. Click the Windows Start Menu, then under All Programs find the Frontline Harmony program group and click on "Harmony Tester."
2. Open the Frontline Harmony Folder that was added during installation to your desktop and click on "Harmony Tester."
3. The Harmony Tester interface is comprised of eight panes (Figure 2.12)
   a. Test Selection – allows you to select tests to run
   b. Run Explorer – allows you to review tests that have already been completed
   c. Event Viewer – the Event Viewer is a record of significant events that occurred at any time the Harmony LE Tester is running
   d. Project Settings – provides test settings
   e. Tester and IUT Configuration – provides for configuration of Harmony hardware and IUT hardware
   f. IXIT Data – provides for Implementation eXtra Information for Test (Implementation-specific values that further describe the capabilities of the IUT, e.g. the limits of what is supported).
   g. IUT Information – provides for customer, manufacturer and product information
   h. Test Results – provides pass/fail feedback on tests run
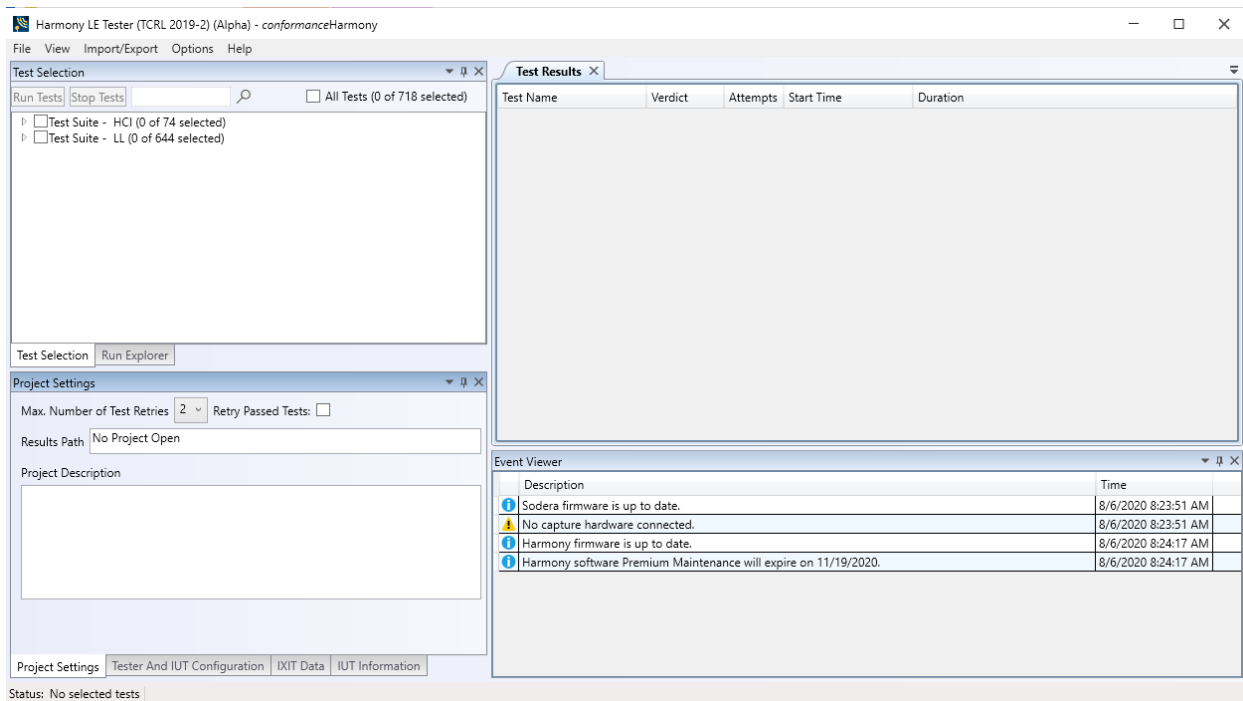
Figure 2.12 – Harmony Tester Interface

Chapter 3. Configuration Settings

In this chapter we describe the configurations required for the best testing results using the Frontline Harmony.

3.1 Configuring the Software

3.1.1 Project Settings

Click the "Project Settings" tab to configure basic project settings. (Figure 3.1)
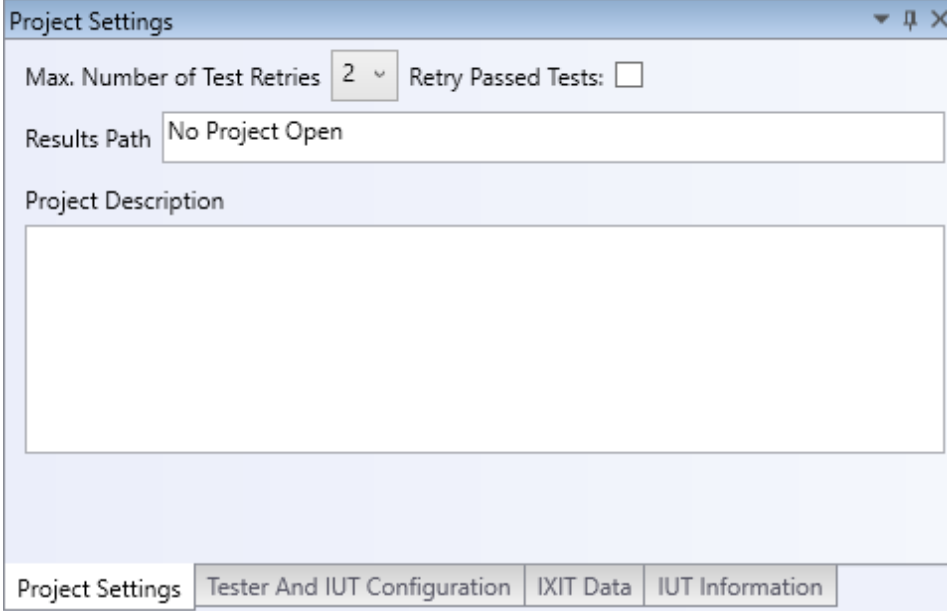
Figure 3.1 – Project Settings Configuration

1. Use the drop down box next to "Max. Number of Test Retries" to the desired number. The Harmony software allows 0-9 automatic test retries to allow for noise interference or other hard to control environmental factors.
2. The Results Path will remain unspecified until you save your project, at which time you will name the location of your project files, specify a project name, and add a project description. (Figure 3.2)
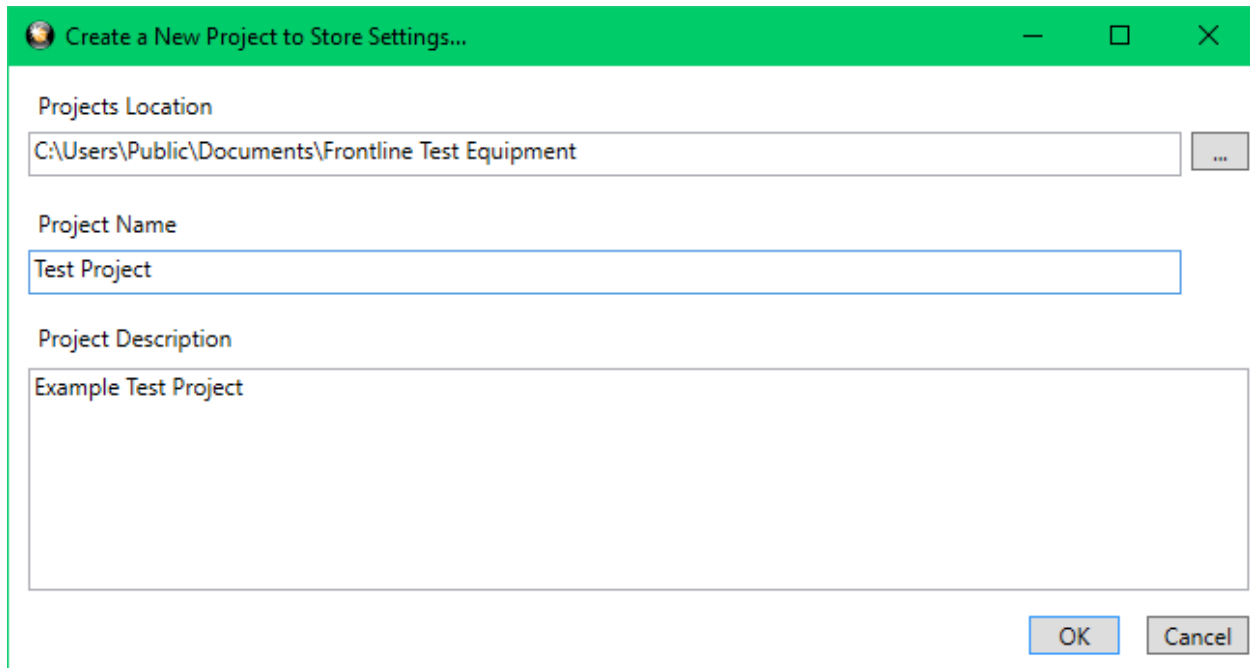
Figure 3.2 – Create a New Project Dialog

3. Clicking "OK" saves the project files into the specified location. If the specified folder does not already exist, the Harmony software creates the folder.

3.1.2 Tester and IUT Configuration

Click the "Tester and IUT Configuration" tab to configure settings affecting the Harmony tester, PC connection, and the IUT. (Figure 3.3)
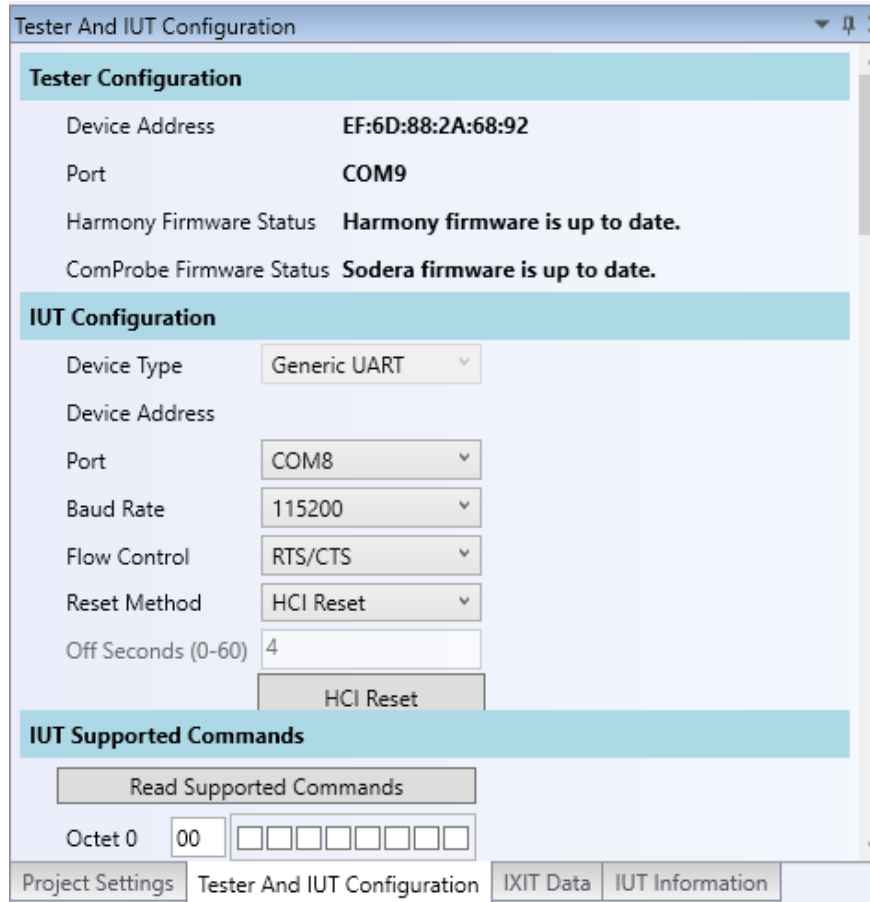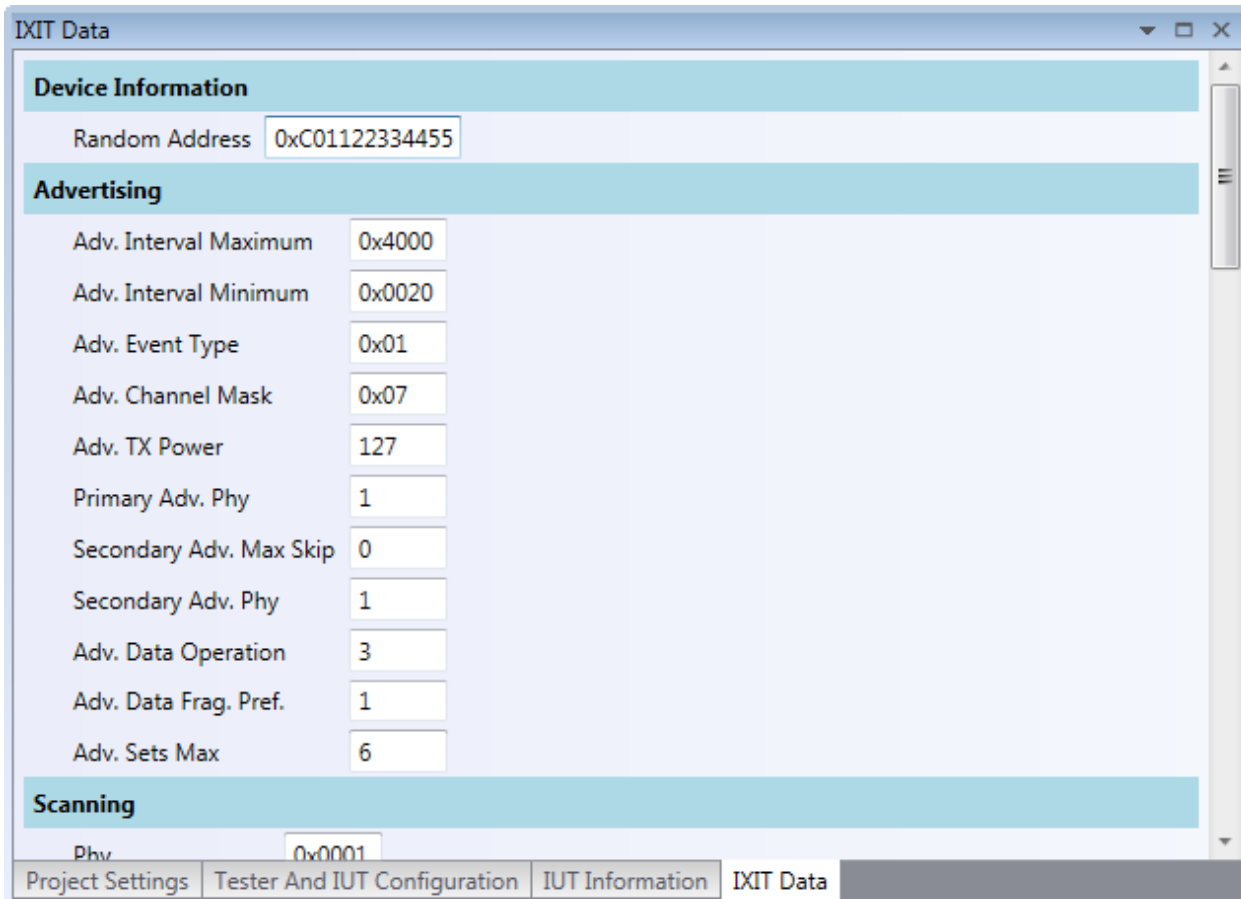
Figure 3.3 – Tester and IUT Configuration

1. If the Harmony hardware is connected, the BD ADDR of the Harmony and the port that the Harmony is connected to will be displayed.
2. Connect the IUT.
3. Under IUT Configuration, set Device Type to Generic UART.
4. The BD ADDR of the IUT will remain blank until testing is started. Once testing has started the BD ADDR for the IUT will be filled in automatically.
5. Select the correct PORT for the IUT to enable a connection to the IUT.
6. Select the correct Baud Rate for the IUT.
7. Select the correct Flow Control for the IUT.
8. Select the preferred method for resetting the IUT between test cases:
   a. HCI Reset – this setting will allow the Harmony tester to send an HCI reset command to the IUT
   b. Power Cycle – this setting will allow the Harmony tester to shut off power to the USB port and toggle the relay for a configurable number of seconds. Note: The "Off Seconds" textbox will be enabled when "Power Cycle" is selected.
9. Click the "IUT Supported Commands" button to populate the octet fields. Note: It is important to fill in the octet fields otherwise some tests will fail.

3.1.3 IXIT Data

Click the "IXIT Data" tab to configure device and advertising information that may be required by certain Bluetooth SIG specified test cases. (Figure 3.4)

Figure 3.4 – IXIT Data

3.1.4 IUT Information

Click the "IUT Information" tab to configure customer, manufacturer and product meta data. Some fields are required so that any Test Reports produced include the information expected in a Bluetooth validation report. (Figure 3.5)

Figure 3.5 – IUT Information

Chapter 4. Running Tests

Harmony software allows you to run one, multiple or all Link Layer and HCI tests provided. (Figure 4.1)
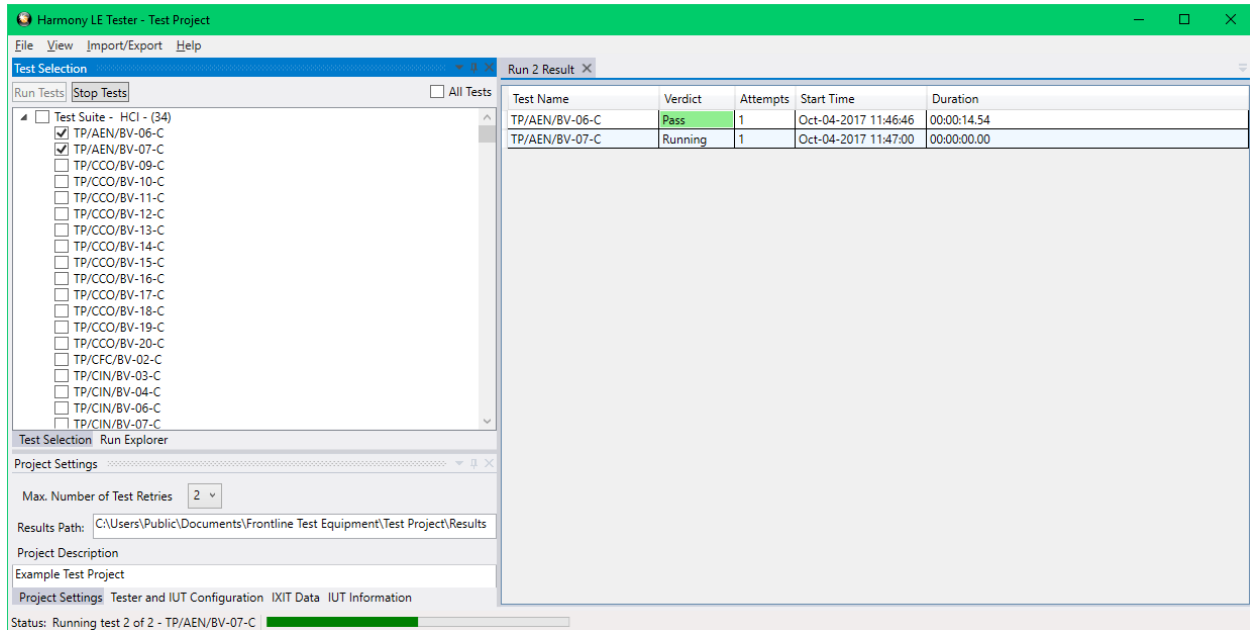
Figure 4.1 – Running Tests

4.1 Selecting Tests

4.1.1 HCI

The Harmony software provides 74 HCI tests (Table 4.1). To run HCI tests, expand the HCI Test Suite to select one or more specific tests, or you may select Test Suite – HCI to run all HCI tests.

Table 4.1 – HCI Tests

Test	Description Summary
HCI/AEN/BI-01-C	Verify that the IUT can return an error when invalid public keys is received.
HCI/AEN/BV-06-C	Verify that the IUT can generate a P-256 Public-Private key pair and return the P-256 Public Key
HCI/AEN/BV-07-C	Verify that the IUT can generate a new Diffie-Hellman Key
HCI/AEN/BV-08-C	Generate Debug Keys
HCI/BIS/BV-01-C	Broadcast Isochronous Stream Using Non-Test Command, all PHYs
HCI/BIS/BV-02-C	Broadcast Isochronous Stream Using Non-Test Command, not all PHYs
HCI/CCO/BI-01-C	Resolving List Commands fail when list in use
HCI/CCO/BI-02-C	Resolving List Commands fail when list in use
HCI/CCO/BI-03-C	Resolving List Commands fail when list in use
HCI/CCO/BI-04-C	Resolving List Commands fail when list in use
HCI/CCO/BI-05-C	Resolving List Commands fail when list in use
HCI/CCO/BI-06-C	LE Enhanced Read Transmit Power Level – Invalid Connection Handle – Slave
HCI/CCO/BI-07-C	LE Enhanced Read Transmit Power Level – Invalid PHY – Slave
HCI/CCO/BI-08-C	LE Read Remote Transmit Power Level – Invalid Connection Handle – Slave

HCI/CCO/BI-09-C	LE Read Remote Transmit Power Level – Invalid PHY – Slave
HCI/CCO/BI-10-C	LE Set Path Loss Reporting Parameters – Invalid Connection Handle – Slave
HCI/CCO/BI-11-C	LE Set Path Loss Reporting Enable – Invalid Connection Handle – Slave
HCI/CCO/BI-12-C	LE Set Transmit Power Reporting Enable – Invalid Connection Handle – Slave
HCI/CCO/BI-13-C	Invalid Path Loss Monitoring Parameters
HCI/CCO/BV-07-C	Verify that an IUT which supports LE only, does not respond to BR/EDR HCI commands
HCI/CCO/BV-09-C	Verify that the IUT correctly handles the LE Set Data Length Command
HCI/CCO/BV-10-C	Verify that the IUT correctly handles the LE Read Suggested Data Length Command
HCI/CCO/BV-11-C	Verify that the IUT correctly handles the LE Write Suggested Data Length Command
HCI/CCO/BV-12-C	Verify that the IUT correctly handles the LE Remove Device From Resolving List Command
HCI/CCO/BV-13-C	Verify that the IUT correctly handles the LE Clear Resolving List Command
HCI/CCO/BV-14-C	Verify that the IUT correctly handles the LE Read Resolving List Size Command
HCI/CCO/BV-15-C	Verify that the IUT correctly handles the LE Set Default PHY Command
HCI/CCO/BV-16-C	Verify that the IUT correctly handles the LE Read Periodic Advertiser List Size Command
HCI/CCO/BV-17-C	Verify that the IUT correctly handles the LE Add Device To Periodic Advertiser List, LE Remove Device From Periodic Advertiser List, and Clear Periodic Advertiser List commands
HCI/CCO/BV-18-C	Verify that the IUT correctly handles the LE Read Transmit Power Command
HCI/CCO/BV-19-C	Verify that the IUT correctly handles the LE Write RF Path Compensation Command
HCI/CCO/BV-20-C	Verify that the IUT correctly handles the LE Read RF Path Compensation Command
HCI/CFC/BV-02-C	Buffer Size
HCI/CIN/BV-01-C	Verify that the Read Local Supported Features command returns with the correct features supported
HCI/CIN/BV-03-C	Read Local Supported Commands
HCI/CIN/BV-04-C	Read Local Version Information
HCI/CIN/BV-06-C	White List Size
HCI/CIN/BV-09-C	Verify that the LE Read Local Supported Features command returns with the Remote Public Key Validation feature bit enabled.
HCI/CIS/BV-02-C	Connected Isochronous Stream Using Non-Test Command, Master Initiated, all PHYs, symmetric PHYs only
HCI/CIS/BV-03-C	Connected Isochronous Stream Using Non-Test Command, Master Initiated, not all PHYs, asymmetric PHYs
HCI/CIS/BV-04-C	Connected Isochronous Stream Using Non-Test Command, Master Initiated, not all PHYs, symmetric PHYs only
HCI/CM/BI-01-C	LE Extended Create Connection With Unsupported PHY
HCI/CM/BV-01-C	LE Read Peer Resolvable Address Command – Master
HCI/CM/BV-02-C	LE Read Local Resolvable Address Command – Master
HCI/CM/BV-03-C	Verify that the IUT correctly handles the LE Read PHY Command

HCI/CM/BV-04-C	Tests that when the IUT is initiator and an RPA Timeout occurs between the IUT issuing an AUX_CONNECT_REQ PDU and the Lower Tester responding with an AUX_CONNECT_RSP PDU, that the HCI_LE_Enhanced_Connection_Complete_Event returns the latest Peer_Address, Peer_Resolvable_Private_Address and Local_Resolvable_Private_Address sent and received over the air.
HCI/CM/BV-05-C	LE Read Peer Resolvable Address Command – Slave
HCI/CM/BV-06-C	LE Read Local Resolvable Address Command - Slave
HCI/CM/BV-07-C	Request Sleep Clock Accuracy, unsupported SCA Update Feature
HCI/DDI/BI-01-C	Verify that the IUT properly rejects an invalid advertising interval provided to the HCI_LE_Set_Extended_Advertising_Parameters command and returns the expected error code
HCI/DDI/BI-02-C	Verify that the IUT properly rejects an invalid advertising interval provided to the HCI_LE_Set_Advertising_Parameters command and returns the expected error code
HCI/DDI/BI-03-C	Reject LE Periodic Advertising Create Sync Command With Disallowed Reporting Options
HCI/DDI/BI-04-C	Reject LE Periodic Advertising Create Sync Command to a Synchronized Advertising Set
HCI/DDI/BI-05-C	LE Set Extended Scan Parameters With Unsupported PHY
HCI/DDI/BI-06-C	Reject Invalid Enable Command
HCI/DDI/BI-07-C	Reject Invalid Enable Command
HCI/DDI/BI-08-C	Reject Invalid Enable Command
HCI/DDI/BI-09-C	Reject Invalid Enable Command
HCI/DDI/BI-11-C	Reject Invalid Enable Command
HCI/DDI/BI-12-C	Reject Invalid Extended Advertising Enable Command
HCI/DDI/BI-13-C	Reject Invalid Periodic Advertising Enable Command
HCI/DDI/BV-03-C	Set Advertise Enable
HCI/DDI/BV-04-C	Set Scan Enable
HCI/DSU/BV-02-C	Reset in advertising state
HCI/DSU/BV-03-C	Reset to slave
HCI/DSU/BV-04-C	Reset in scanning state
HCI/DSU/BV-05-C	Reset in initiating state
HCI/DSU/BV-06-C	Reset to master
HCI/GEV/BV-01-C	Verify that for each controller supported in the IUT, every HCI command not supported yields a Command Complete event with status Unknown HCI Command in return
HCI/GEV/BV-02-C	Verify that each supported legacy and extended scanning command yields a command complete event with status 'Command Disallowed' in return when sent after a command of the other type
HCI/GEV/BV-03-C	Verify that each supported legacy and extended scanning command yields a Command Complete event with status 'Command Disallowed' in return when sent after a command of the other type
HCI/GEV/BV-04-C	Verify that each specified extended advertising command yields a Command Complete event with status 'Command Disallowed' in return when sent with no scan response data
HCI/HFC/BV-04-C	LE Set Event Mask

HCI/PCL/BV-01-C	LE Enhanced Read Transmit Power Level

4.1.2 IAL

The Harmony software provides 63 IAL tests (Table 4.2). To run IAL tests, expand the IAL Test Suite to select one or more specific tests, or you may select Test Suite – IAL to run all IAL tests.

Table 4.2 – IAL Tests

Test	Description Summary
IAL/CIS/FRA/MAS/BV-03-C_1	Send Single SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-05-C_1	Send Large SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-07-C_1	Send Multiple, Small SDUs, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-10-C_1	Receive Single SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-13-C_1	Receive Large SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-15-C_1	Receive Multiple, Small SDUs, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-18-C_1	Send Zero-Length SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-20-C_1	Receive Zero-Length SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-22-C_1	Simultaneous Sending and Receiving SDUs, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-26-C_1	Send Single SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-29-C_1	Send Large SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-31-C_1	Send Multiple, Small SDUs, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-35-C_1	Receive Single SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-38-C_1	Receive Large SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-39-C_1	Receive Multiple, Small SDUs, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-42-C_1	Send Zero-Length SDU, CIS, Framed, Master
IAL/CIS/FRA/MAS/BV-44-C_1	Receive Zero-Length SDU, CIS, Framed, Master
IAL/CIS/FRA/SLA/BV-03-C_1	Send Single SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-05-C_1	Send Large SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-07-C_1	Send Multiple, Small SDUs, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-10-C_1	Receive Single SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-13-C_1	Receive Large SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-15-C_1	Receive Multiple, Small SDUs, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-18-C_1	Send Zero-Length SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-20-C_1	Receive Zero-Length SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-22-C_1	Simultaneous Sending and Receiving SDUs, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-29-C_1	Send Large SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-31-C_1	Send Multiple, Small SDUs, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-35-C_1	Receive Single SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-38-C_1	Receive Large SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-39-C_1	Receive Multiple, Small SDUs, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-42-C_1	Send Zero-Length SDU, CIS, Framed, Slave
IAL/CIS/FRA/SLA/BV-44-C_1	Receive Zero-Length SDU, CIS, Framed, Slave
IAL/CIS/UNF/MAS/BI-02-C_1	Unsuccessful sending a Large SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BI-03-C_1	Unsuccessful sending a Large SDU, CIS, Unframed, Master

IAL/CIS/UNF/MAS/BV-01-C$_1$	Send Single SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-04-C$_1$	Send Large SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-09-C$_1$	Receive Single SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-12-C$_1$	Receive Large SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-17-C$_1$	Send Zero-Length SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-19-C$_1$	Receive Zero-Length SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-21-C$_1$	Simultaneous Sending and Receiving SDUs, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-24-C$_1$	Simultaneous Sending and Receiving SDUs, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-28-C$_1$	Send Large SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-33-C$_1$	Receive Single SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-36-C$_1$	Receive Large SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-41-C$_1$	Send Zero-Length SDU, CIS, Unframed, Master
IAL/CIS/UNF/MAS/BV-43-C$_1$	Receive Zero-Length SDU, CIS, Unframed, Master
IAL/CIS/UNF/SLA/BI-02-C$_1$	Unsuccessful sending a Large SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BI-03-C$_1$	Unsuccessful sending a Large SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-01-C$_1$	Send Single SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-04-C$_1$	Send Large SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-09-C$_1$	Receive Single SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-12-C$_1$	Receive Large SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-17-C$_1$	Send Zero-Length SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-19-C$_1$	Receive Zero-Length SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-21-C$_1$	Simultaneous Sending and Receiving SDUs, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-24-C$_1$	Simultaneous Sending and Receiving SDUs, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-25-C$_1$	Send Single SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-28-C$_1$	Send Large SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-36-C$_1$	Receive Large SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-41-C$_1$	Send Zero-Length SDU, CIS, Unframed, Slave
IAL/CIS/UNF/SLA/BV-43-C$_1$	Receive Zero-Length SDU, CIS, Unframed, Slave

1 These tests are available for early access and have not been approved by the SIG.

4.1.3 Link Layer

The Harmony software provides 658 Link Layer tests (Table 4.3). To run LL tests, expand the LL Test Suite to select one or more specific tests, or you may select Test Suite – LL to run all Link Layer tests.

Table 4.3 – Link Layer Tests

Test	Description Summary
LL/BIS/BRD/BV-04-C$_1$	Data Transmission in Multiple Broadcast Isochronous Streams, Interleaved BIG
LL/BIS/BRD/BV-05-C$_1$	Data Transmission in Multiple Broadcast Isochronous Streams, Sequential
LL/BIS/BRD/BV-07-C	Bursting of Packets in Broadcast Isochronous Stream
LL/BIS/SNC/BV-01-C	Broadcast Isochronous Stream Synchronization Setup – Encryption Disabled
LL/BIS/SNC/BV-04-C $_1$	Data Reception in Multiple Broadcast Isochronous Streams

LL/BIS/SNC/BV-07-C	Bursting of Packets in Broadcast Isochronous Stream
LL/BIS/SNC/BV-08-C $_1$	Pre-transmissions in Broadcast Isochronous Stream
LL/BIS/SNC/BV-09-C	Broadcast Isochronous Group Channel Map Update Procedure
LL/BIS/SNC/BV-10-C $_1$	Broadcast Isochronous Stream Termination
LL/BIS/SNC/BV-11-C	Loss of Sync with an Isochronous Broadcaster
LL/BIS/SNC/BV-12-C $_1$	Broadcast Isochronous Stream Synchronization, Number of BISes Not Supported
LL/BIS/SNC/BV-13-C	Broadcast Isochronous Group Channel Map Update Procedure - Encrypted
LL/CIS/MAS/BV-01-C	CIS Setup Procedure, Master Initiated – LE 1M PHY
LL/CIS/MAS/BV-02-C	CIS Setup Procedure, Master Initiated – LE 2M PHY
LL/CIS/MAS/BV-03-C	CIS Setup Procedure, Master Initiated, Unsupported
LL/CIS/MAS/BV-04-C	New Channel Map
LL/CIS/MAS/BV-05-C	Sending data in Unidirectional CIS
LL/CIS/MAS/BV-06-C $_1$	Receiving data in Unidirectional CIS
LL/CIS/MAS/BV-08-C $_1$	Sending and Receiving Data in Multiple CISes, Single CIG, Single Connection, Interleaved CIG, Master
LL/CIS/MAS/BV-09-C $_1$	Sending and Receiving Data in Multiple CISes, Single CIG, Single Connection, Sequential, Master
LL/CIS/MAS/BV-10-C $_1$	Sending and Receiving Data in Multiple CISes, Single CIG, Multiple Connections, Interleaved CIG
LL/CIS/MAS/BV-11-C $_1$	Sending and Receiving Data in Multiple CISes, Single CIG, Multiple Connections, Sequential
LL/CIS/MAS/BV-13-C	Acknowledgement Scheme, Master – Encryption Disabled
LL/CIS/MAS/BV-17-C $_1$	Flushing of Packets in CIS, Master
LL/CIS/MAS/BV-18-C $_1$	Bursting of Payloads in CIS, Master
LL/CIS/MAS/BV-19-C $_1$	Deterministic Packet Transmission in CIS, Master
LL/CIS/MAS/BV-20-C	Set Encryption After CIS Established
LL/CIS/MAS/BV-24-C	CIS Updating Peer Clock Accuracy
LL/CIS/MAS/BV-25-C	CIS Setup Procedure, Master Initiated – LE Coded PHY
LL/CIS/MAS/BV-26-C $_1$	Connected Isochronous Stream Using Non-Test Command, Master Initiated – LE 1M PHY
LL/CIS/MAS/BV-27-C $_1$	Connected Isochronous Stream Using Non-Test Command, Master Initiated – LE 2M PHY
LL/CIS/MAS/BV-28-C $_1$	Connected Isochronous Stream Using Non-Test Command, Master Initiated – LE Coded PHY
LL/CIS/MAS/BV-29-C	Acknowledgement Scheme, Master – Enabled
LL/CIS/MAS/BV-30-C	Isochronous Channels Host Support Feature Bit
LL/CIS/MAS/BV-31-C	CIS Setup Procedure, Master Initiated – LE 2M PHY
LL/CIS/MAS/BV-32-C $_1$	CIS Setup Procedure, Master Initiated – LE 1M PHY
LL/CIS/SLA/BV-01-C	CIS Setup Response Procedure, Slave – LE 1M PHY
LL/CIS/SLA/BV-02-C	CIS Setup Response Procedure, Slave, Reject Response
LL/CIS/SLA/BV-03-C	CIS Map Update
LL/CIS/SLA/BV-04-C	Sending data in Unidirectional CIS

LL/CIS/SLA/BV-05-C [1]	Receiving data in Unidirectional CIS
LL/CIS/SLA/BV-07-C [1]	Sending and Receiving Data in Multiple CISes, Single CIG, Single Connection, Interleaved CIG, Slave
LL/CIS/SLA/BV-08-C [1]	Sending and Receiving Data in Multiple CISes, Single CIG, Single Connection, Sequential, Slave
LL/CIS/SLA/BV-10-C	Acknowledgement Scheme, Slave – Encryption Disabled
LL/CIS/SLA/BV-14-C [1]	Flushing of Packets in CIS, Slave
LL/CIS/SLA/BV-15-C	Bursting of Payloads in CIS, Slave
LL/CIS/SLA/BV-16-C [1]	Deterministic Packet Transmission in CIS, Slave
LL/CIS/SLA/BV-18-C	CIS Updating Peer Clock Accuracy
LL/CIS/SLA/BV-19-C	CIS Setup Response Procedure, Slave – LE 2M PHY
LL/CIS/SLA/BV-20-C	CIS Setup Response Procedure, Slave – LE Coded PHY
LL/CIS/SLA/BV-21-C	Acknowledgement Scheme, Slave – Encryption Enabled
LL/CIS/SLA/BV-22-C	CIS Request Event Not Set
LL/CIS/SLA/BV-23-C	CIS Setup Response Procedure, Slave – LE 2M PHY
LL/CIS/SLA/BV-24-C	CIS Setup Response Procedure, Slave – LE 1M PHY
LL/CON/ADV/BI-01-C	Connection Supervision Timeout During Fail Connection Setup
LL/CON/ADV/BV-01-C	Accepting Connections
LL/CON/ADV/BV-02-C	Accepting Connections Timeout
LL/CON/ADV/BV-03-C	ADVERTISING/MASTER - Master Packets
LL/CON/ADV/BV-04-C	Tests that an advertiser IUT upon receiving a connection indication to the directed advertising indications stops advertising after the reception and starts to maintain a connection in the slave role
LL/CON/ADV/BV-05-C	Extended Advertising, Accepting Connections – LE 1M PHY
LL/CON/ADV/BV-06-C	Tests that an advertiser IUT using undirected connectable advertising with legacy PDUs receives a connection indication on the primary channel stops advertising after the reception and starts to maintain a connection in the slave role
LL/CON/ADV/BV-07-C	Tests that an advertiser IUT receives a connection request stops advertising after the reception and starts to maintain a connection in the slave role when the connection request indicates no support for Channel Selection Algorithm #2
LL/CON/ADV/BV-08-C	Tests that an advertiser IUT receives a connection request to the directing advertising indication stops advertising after the reception and starts to maintain a connection in the slave role when the connection request indicates no support for Channel Selection Algorithm #2
LL/CON/ADV/BV-09-C	Tests that an advertiser IUT receives a connection request stops advertising after the reception and starts to maintain a connection in the slave role when the connection request indicates support for Channel Selection Algorithm #2
LL/CON/ADV/BV-10-C	Tests that an advertiser IUT receives a connection request to the directing advertising indication stops advertising after the reception and starts to maintain a connection in the slave role when the connection request indicates support for Channel Selection Algorithm #2

LL/CON/ADV/BV-11-C	Accepting Connections, IUT Channel Selection Algorithm #1, Lower Tester Channel Selection Algorithm #2
LL/CON/ADV/BV-12-C	Extended Advertising, Accepting Connections – LE 2M PHY
LL/CON/ADV/BV-13-C	Extended Advertising, Accepting Connections – LE Coded PHY
LL/CON/ADV/BV-14-C	Extended Advertising, Accepting Connections with Random address – LE 1M PHY
LL/CON/ADV/BV-15-C	Extended Advertising, Accepting Connections with Random address – LE 2M PHY
LL/CON/ADV/BV-16-C	Extended Advertising, Accepting Connections with Random address – LE Coded PHY
LL/CON/INI/BI-01-C	Tests that an initiator IUT ignores advertising packets with an invalid checksum
LL/CON/INI/BI-02-C	Tests that an initiator IUT sends a connection indication to an advertiser and receiving reply transmissions with invalid checksums from the slave up to the point of expiring the connection supervision timer considers the connection failed
LL/CON/INI/BV-01-C	Tests that an initiator IUT sends a connection indication to an advertiser and starts to maintain a connection in the master role
LL/CON/INI/BV-02-C	Tests that an initiator IUT sends a connection indication to an advertiser using directed advertising events and starts to maintain a connection in the master role
LL/CON/INI/BV-03-C	Tests that an initiator IUT sends a connection indication to an advertiser and after missing some reply transmissions from the slave still manages to setup a connection in the master role. This test purpose reflects a typical scenario which the IUT must manage
LL/CON/INI/BV-04-C	Connection Initiation Timeout
LL/CON/INI/BV-06-C	Initiation Device Filtering: Undirected
LL/CON/INI/BV-07-C	Initiation Device Filtering: Directed
LL/CON/INI/BV-08-C	LE Set Address Resolution Enable Command - Initiator
LL/CON/INI/BV-09-C	Verify that the IUT when init conn est only connect to devices that are in the RL
LL/CON/INI/BV-10-C	Verify that the IUT when init conn est with the RL conn only to peer devs that are in the RL
LL/CON/INI/BV-11-C	Verify that the IUT when initiating connection establishment with the resolving list connects only to directed advertisements that are addressed to the IUT
LL/CON/INI/BV-12-C	Verify that the IUT when init private connection establishment with the RL does not conn to direct that are addressed to the IUT using its ID addr
LL/CON/INI/BV-13-C	Extended Scanning, Connection Initiation – LE 1M PHY
LL/CON/INI/BV-14-C	Tests that an initiator IUT sends a connection request to an advertiser and starts to maintain a connection in the master role when the advertisement indicates no support of Channel Selection Algorithm #2
LL/CON/INI/BV-15-C	Tests that an initiator IUT sends a connection request to an advertiser using directed advertising and starts to maintain a connection in the master role when the advertisement indicates no support of Channel Selection Algorithm #2

LL/CON/INI/BV-16-C	Tests that an initiator IUT sends a connection request to an advertiser and starts to maintain a connection in the master role when the advertisement indicates support of Channel Selection Algorithm #2
LL/CON/INI/BV-17-C	Tests that an initiator IUT sends a connection request to an advertiser using directed advertising and starts to maintain a connection in the master role when the advertisement indicates support of Channel Selection Algorithm #2
LL/CON/INI/BV-18-C	Verify that the IUT when initiating connection establishment does not connect to a device advertising using its device identity address when the identity address and an associated IRK are in the resolving list using network privacy mode
LL/CON/INI/BV-19-C	Verify that the IUT when initiating connection establishment does not connect to a device advertising using its device identity address when the identity address and an associated IRK are in the resolving list using network privacy mode
LL/CON/INI/BV-20-C	Verify that the IUT when initiating connection establishment connects to a device advertising using its device identity address when the identity address and an associated IRK are in the resolving list using device privacy mode
LL/CON/INI/BV-21-C	Verify that the IUT when initiating connection establishment connects to a device advertising using its device identity address when the identity address and an associated IRK are in the resolving list using device privacy mode
LL/CON/INI/BV-22-C	Tests that an initiator IUT that only supports Channel Selection Algorithm #1 sends a connection request to an advertiser and starts to maintain a connection in the master role when the advertisement indicates support of Channel Selection Algorithm #2. The Lower Tester first acts in the advertising state with ChSel set to one (1), then accepts the connection and starts to maintain it in the slave role, observing the packet and timing from the IUT. The IUT confirms the Channel Selection Algorithm #1 is used for the connection.
LL/CON/INI/BV-23-C	Network Privacy - Connection Establishment using whitelist and resolving list with address resolution disabled
LL/CON/INI/BV-24-C	Network Privacy - Connection Establishment using resolving list with address resolution disabled
LL/CON/INI/BV-25-C	Extended Scanning, Connection Initiation – LE 2M PHY
LL/CON/INI/BV-26-C	Extended Scanning, Connection Initiation – LE Coded PHY
LL/CON/MAS/BI-02-C	Master T_Terminate Timer
LL/CON/MAS/BI-04-C	Test that a slave device is able to recover from a control procedure failure
LL/CON/MAS/BI-05-C	MASTER - Initiating Connection Parameter Request - Timeout
LL/CON/MAS/BI-06-C	Accepting Connection Parameter Request - Illegal Parameters
LL/CON/MAS/BI-07-C	Data Length Update – Handling Invalid Data Length Responses – LE 1M PHY
LL/CON/MAS/BI-08-C	Data Length Update – Handling Invalid Data Length Responses – LE 2M PHY
LL/CON/MAS/BI-09-C	Data Length Update – Handling Invalid Data Length Responses – LE Coded PHY

LL/CON/MAS/BV-02-C	Test that a master IUT is able to maintain a connection when the slave using the slave latency mechanism
LL/CON/MAS/BV-03-C	Master Sending Data
LL/CON/MAS/BV-04-C	MASTER - Master Receiving Data
LL/CON/MAS/BV-05-C	MASTER - Master Sending And Receiving Data
LL/CON/MAS/BV-07-C	Requesting Parameter Update
LL/CON/MAS/BV-08-C	Master Sending Termination
LL/CON/MAS/BV-09-C	Master Accepting Termination
LL/CON/MAS/BV-10-C	Test that a master IUT terminates a connection by the supervision timer
LL/CON/MAS/BV-13-C	MASTER - Feature Setup Request
LL/CON/MAS/BV-14-C	Test that a master IUT is able to maintain a connection using the acknowledgement scheme and retransmit
LL/CON/MAS/BV-15-C	Test that a master IUT is able to maintain a connection using the acknowledgement scheme and retransmit a data packet on a negative acknowledgement
LL/CON/MAS/BV-16-C	Test that a master IUT is able to maintain a connection using the acknowledgement scheme and repeats a positive acknowledgement of a packet
LL/CON/MAS/BV-17-C	Test that a master IUT is able to maintain a connection using the acknowledgement scheme and preserve the packet sequence numbering in the case of a lost negative acknowledgement
LL/CON/MAS/BV-18-C	Test that a master IUT is able to maintain a connection using the acknowledgement scheme with the slave using latency
LL/CON/MAS/BV-19-C	Connection Control Timeout
LL/CON/MAS/BV-20-C	Master Request Version
LL/CON/MAS/BV-21-C	Test that a connected master IUT responds to the request from the Tester to perform the version exchange procedure
LL/CON/MAS/BV-22-C	MASTER - Master Acknowledgement Scheme
LL/CON/MAS/BV-23-C	MASTER - Responding to Feature Exchange
LL/CON/MAS/BV-24-C	MASTER - Initiating Connection Parameter Request - Accept
LL/CON/MAS/BV-25-C	MASTER - Initiating Connection Parameter Request - Reject
LL/CON/MAS/BV-26-C	Initiating Connection Parameter Request - Same Procedure Collision
LL/CON/MAS/BV-27-C	Initiating Connection Parameter Request - Different Procedure Collision - Channel Map Update
LL/CON/MAS/BV-28-C	Initiating Connection Parameter Request - Different Procedure Collision - Encryption
LL/CON/MAS/BV-29-C	MASTER - Initiating Connection Parameter Request - Remote Legacy Host
LL/CON/MAS/BV-30-C	Accepting Connection Parameter Request - No Preferred Periodicity
LL/CON/MAS/BV-31-C	Accepting Connection Parameter Request - Preferred Anchor Points Only
LL/CON/MAS/BV-32-C	Accepting Connection Parameter Request - Preferred Periodicity
LL/CON/MAS/BV-33-C	Accepting Connection Parameter Request - Preferred Periodicity and Preferred Anchor Points
LL/CON/MAS/BV-34-C	MASTER - Accepting Connection Parameter Request - Event Masked
LL/CON/MAS/BV-35-C	MASTER - Accepting Connection Parameter Request - Host Rejects

LL/CON/MAS/BV-41-C	Test that a master IUT is able to perform the PHY update procedure
LL/CON/MAS/BV-42-C	Test that a master IUT is able to perform the PHY update procedure when asymmetric links are not supported
LL/CON/MAS/BV-43-C	Test that a master IUT is able to respond to a PHY update procedure from a slave device
LL/CON/MAS/BV-44-C	Test that a master IUT is able to respond to a PHY update procedure from a slave device when asymmetric links are not supported
LL/CON/MAS/BV-45-C	Test that a master IUT is able to perform the PHY update procedure when there is a procedure collision between the IUT's PHY change request and the remote device's PHY change request
LL/CON/MAS/BV-46-C	Test that a master IUT terminates the Link Layer connection if the master-initiated PHY update procedure is not completed before the procedure response timer expires
LL/CON/MAS/BV-47-C	Test that a master IUT is able to perform the channel map update procedure when there is a procedure collision between the IUT's channel map update and the Lower Tester's PHY change request
LL/CON/MAS/BV-48-C	Test that a master IUT is able to perform the connection parameters request procedure when there is a procedure collision between the IUT's connection parameters request and the Lower Tester's PHY change request
LL/CON/MAS/BV-49-C	Test that a master IUT follows all packet time restrictions both during and after PHY change when it initiates the PHY update procedure
LL/CON/MAS/BV-50-C	Test that a master IUT both during and after PHY change follows all packet time restrictions when it responds to a PHY update procedure from a slave device
LL/CON/MAS/BV-51-C	Test that a master IUT correctly handles the case where it initiates a PHY update procedure but no common PHYs are available
LL/CON/MAS/BV-52-C	Test that a master IUT is able to receive data from a slave device when the slave is transitioning between 125kbit and 500kbit coded rates. Confirm that IUT responds within the allowed T_IFS times for each packet at either coded rate. Test is performed with the IUT's minimum and maximum supported packet length. A Data Length Update Procedure is performed if required
LL/CON/MAS/BV-53-C	Test that a master IUT follows all packet time restrictions both during and after PHY update when it initiates the PHY Update Procedure. In particular test that the IUT does not queue a packet for transmission that would satisfy the requirements when queued but violate them if it is still waiting for retransmission after the PHY Update instant
LL/CON/MAS/BV-54-C	Test that a master IUT both during and after PHY update when it responds to a PHY Update Procedure from a slave device. In particular test that the IUT does not queue a packet for transmission that would satisfy the requirements when queued but violate them if it is still waiting for retransmission after the PHY Update instant
LL/CON/MAS/BV-55-C	Test that a master IUT still transmits data even when the TxTime and/or RxTime values for LE Coded PHY suggest a smaller possible data length than the minimum length data PDU (27 octets)
LL/CON/MAS/BV-56-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA – LE 1M PHY

LL/CON/MAS/BV-57-C	Constant Tone Extension Request Procedure, IUT Initiated, Periodic
LL/CON/MAS/BV-58-C	Constant Tone Extension Request Procedure, IUT Initiated, Responses Disabled
LL/CON/MAS/BV-59-C	Verifies that the IUT correctly handles the case where the remote does not support the Connection CTE Response feature.
LL/CON/MAS/BV-60-C	Constant Tone Extension Request Procedure, IUT Initiated, Timeout
LL/CON/MAS/BV-61-C	Constant Tone Extension Request Procedure, IUT Responding, AoA
LL/CON/MAS/BV-62-C	Constant Tone Extension Request Procedure, IUT Responding, Responses Disabled
LL/CON/MAS/BV-63-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD – LE 1M PHY
LL/CON/MAS/BV-64-C	Constant Tone Extension Request Procedure, IUT Responding, AoD
LL/CON/MAS/BV-65-C	Unrequested Constant Tone Extension, IUT Receiving, AoA – LE 1M PHY
LL/CON/MAS/BV-66-C	Unrequested Constant Tone Extension, IUT Receiving, AoD – LE 1M PHY
LL/CON/MAS/BV-67-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA, Encrypted Connection – LE 1M PHY
LL/CON/MAS/BV-68-C	Constant Tone Extension Request Procedure, IUT Responding, AoA, Encrypted Connection
LL/CON/MAS/BV-69-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD, Encrypted Connection – LE 1M PHY
LL/CON/MAS/BV-70-C	Constant Tone Extension Request Procedure, IUT Responding, AoD, Encrypted Connection
LL/CON/MAS/BV-71-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA, Incorrect CRC – LE 1M PHY
LL/CON/MAS/BV-72-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD, Incorrect CRC – LE 1M PHY
LL/CON/MAS/BV-73-C	Verify that the IUT as Master correctly handles reception of an LL_LENGTH_REQ PDU on the LE 1M PHY
LL/CON/MAS/BV-74-C	Verify that a master IUT is able to perform the Data Length Update Procedure by sending an LL_LENGTH_REQ PDU on the LE 1M PHY
LL/CON/MAS/BV-75-C	Verify that the IUT as Master correctly handles communication with a Lower Tester that does not support the Data Length Update Procedure
LL/CON/MAS/BV-76-C	Verify that the IUT as Master correctly handles reception of an LL_LENGTH_REQ PDU on the LE 2M PHY
LL/CON/MAS/BV-77-C	Verify that a master IUT is able to perform the Data Length Update Procedure by sending an LL_LENGTH_REQ PDU on the LE 2M PHY
LL/CON/MAS/BV-78-C	Verify that the IUT as Master correctly handles reception of an LL_LENGTH_REQ PDU on the LE Coded PHY
LL/CON/MAS/BV-79-C	Verify that a master IUT is able to perform the Data Length Update Procedure by sending an LL_LENGTH_REQ PDU on the LE Coded PHY
LL/CON/MAS/BV-80-C	Verify that the IUT as Master correctly handles communication with a Lower Tester that does not support the Data Length Update Procedure on LE Coded PHY
LL/CON/MAS/BV-81-C	Test that a master IUT is able to perform the connection parameter request procedure when a feature exchange has not been performed and the remote device does not support the request

LL/CON/MAS/BV-82-C	Test that a master IUT is able to perform the connection parameter request procedure after the feature exchange reveals that the remote device does not support the request
LL/CON/MAS/BV-83-C	Constant Tone Extension Request Procedure, IUT Responding, Unsupported
LL/CON/MAS/BV-84-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/MAS/BV-85-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/MAS/BV-86-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/MAS/BV-87-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/MAS/BV-88-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/MAS/BV-89-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/MAS/BV-90-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/MAS/BV-91-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/MAS/BV-92-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/MAS/BV-93-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/MAS/BV-94-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/MAS/BV-95-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/MAS/BV-96-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/MAS/BV-97-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/MAS/BV-98-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/MAS/BV-99-C	Periodic Advertising Sync Transfer Procedure, Accepting – Skipping Events
LL/CON/MAS/BV-100-C	Periodic Advertising Sync Transfer Procedure, Accepting – Already Synchronized
LL/CON/MAS/BV-101-C	Periodic Advertising Sync Transfer Procedure, Accepting – Extreme Timings
LL/CON/MAS/BV-102-C	Periodic Advertising Sync Transfer Procedure, Accepting – Synchronization Failure
LL/CON/MAS/BV-103-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different Modes and Addresses
LL/CON/MAS/BV-104-C	Periodic Advertising Sync Transfer Procedure, Accepting, Changing Transfer Mode During Synchronization
LL/CON/MAS/BV-105-C	Acknowledging Long Control PDUs
LL/CON/MAS/BV-106-C	Acknowledging Long Control PDUs
LL/CON/MAS/BV-107-C	Acknowledging Long Control PDUs
LL/CON/MAS/BV-108-C	Rejecting Request To Send Long Control PDUs before Feature Exchange – LE 1M PHY
LL/CON/MAS/BV-109-C	Rejecting Request To Send Long Control PDUs before Feature Exchange – LE 2M PHY
LL/CON/MAS/BV-110-C	Rejecting Request To Send Long Control PDUs before Feature Exchange – LE Coded PHY
LL/CON/MAS/BV-111-C	Rejecting Request To Send Long Control PDUs after Feature Exchange – LE 1M PHY
LL/CON/MAS/BV-112-C	Rejecting Request To Send Long Control PDUs after Feature Exchange – LE 2M PHY
LL/CON/MAS/BV-113-C	Rejecting Request To Send Long Control PDUs after Feature Exchange – LE Coded PHY

LL/CON/MAS/BV-114-C	Sending Long Control PDUs after Feature Exchange – LE 1M PHY
LL/CON/MAS/BV-115-C	Sending Long Control PDUs after Feature Exchange – LE 2M PHY
LL/CON/MAS/BV-116-C	Sending Long Control PDUs after Feature Exchange – LE Coded PHY
LL/CON/MAS/BV-117-C	PHY Update Procedure – Master Requests Asymmetrical, Slave Symmetrical
LL/CON/MAS/BV-118-C	Unrequested Constant Tone Extension, IUT Receiving, AoD – LE 2M PHY
LL/CON/MAS/BV-119-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA – LE 2M PHY
LL/CON/MAS/BV-120-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD – LE 2M PHY
LL/CON/MAS/BV-121-C	Unrequested Constant Tone Extension, IUT Receiving, AoA – LE 2M PHY
LL/CON/MAS/BV-122-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA, Encrypted Connection – LE 2M PHY
LL/CON/MAS/BV-123-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD, Encrypted Connection – LE 2M PHY
LL/CON/MAS/BV-124-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA, Incorrect CRC – LE 2M PHY
LL/CON/MAS/BV-125-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD, Incorrect CRC – LE 2M PHY
LL/CON/MAS/BV-126-C	Data Length Update – Preserve Parameters After a PHY Change – LE 2M PHY
LL/CON/MAS/BV-127-C	Data Length Update – Preserve Parameters After a PHY Change – LE Coded PHY
LL/CON/MAS/BV-128-C	Data Length Update – Retransmission During an Update
LL/CON/MAS/BV-129-C	Data Length Update – Peer Does Not Support LE Coded PHY – supportedMaxTxTime
LL/CON/MAS/BV-131-C	Verify that an IUT stops sending CTE requests after changing to a PHY that doesn't allow Constant Tone Extensions
LL/CON/SLA/BI-01-C	Test that a slave IUT accepts the master transmission at the beginning of an event as the anchor point irrespective of the checksum result
LL/CON/SLA/BI-02-C	Slave T_Terminate Timer
LL/CON/SLA/BI-04-C	SLAVE - Rejecting Connection Change
LL/CON/SLA/BI-05-C	Test that a slave device is able to recover from a control procedure failure
LL/CON/SLA/BI-07-C	SLAVE - Initiating Connection Parameter Request - Timeout
LL/CON/SLA/BI-08-C	Accepting Connection Parameter Request - Illegal Parameters
LL/CON/SLA/BI-09-C	Test that a slave IUT terminates the Link Layer connection if master-initiated PHY update procedure specifies an instant that is in the past
LL/CON/SLA/BI-10-C	Data Length Update – Handling Invalid Data Length Responses – LE 1M PHY
LL/CON/SLA/BI-11-C	Data Length Update – Handling Invalid Data Length Responses – LE 2M PHY
LL/CON/SLA/BI-12-C	Data Length Update – Handling Invalid Data Length Responses – LE Coded PHY
LL/CON/SLA/BV-02-C	SLAVE - Invalid CRC Anchor Point
LL/CON/SLA/BV-04-C	Slave Sending Data
LL/CON/SLA/BV-05-C	SLAVE - Slave Receiving Data
LL/CON/SLA/BV-06-C	SLAVE - Slave Sending And Receiving Data

LL/CON/SLA/BV-10-C	Accepting Parameter Update
LL/CON/SLA/BV-11-C	Slave Sending Termination
LL/CON/SLA/BV-12-C	SLAVE - Slave Accepting Termination
LL/CON/SLA/BV-13-C	SLAVE - Slave Supervision Timer
LL/CON/SLA/BV-14-C	Feature Setup Response
LL/CON/SLA/BV-15-C	Tests that a slave IUT is able to maintain a connection observing the acknowledgement scheme while receiving invalid checksums in data packets
LL/CON/SLA/BV-16-C	Tests that a slave IUT is able to maintain a connection observing the acknowledgement scheme and retransmit a data packet on a negative acknowledgement
LL/CON/SLA/BV-17-C	Tests that a slave IUT is able to maintain a connection observing the acknowledgement scheme and repeats a positive acknowledgement of a packet
LL/CON/SLA/BV-18-C	Tests that a slave IUT is able to maintain a connection observing the acknowledgement scheme and preserve the packet sequence numbering in the case of a lost negative acknowledgement
LL/CON/SLA/BV-19-C	SLAVE - Slave Request Version
LL/CON/SLA/BV-20-C	SLAVE - Slave Request Version
LL/CON/SLA/BV-21-C	SLAVE - Slave Acknowledgement Scheme
LL/CON/SLA/BV-22-C	SLAVE - Initiate Feature Exchange
LL/CON/SLA/BV-23-C	SLAVE - Initiate Feature Exchange - Master Does Not Support
LL/CON/SLA/BV-24-C	Slave - Initiating Connection Parameter Request - Accept
LL/CON/SLA/BV-25-C	SLAVE - Initiating Connection Parameter Request - Reject
LL/CON/SLA/BV-26-C	Initiating Connection Parameter Request - Same Procedure Collision
LL/CON/SLA/BV-27-C	Initiating Connection Parameter Request - Different Procedure Collision - Channel Map Update
LL/CON/SLA/BV-28-C	Initiating Connection Parameter Request - Different Procedure Collision - Encryption
LL/CON/SLA/BV-29-C	Accepting Connection Parameter Request - No Preferred Periodicity
LL/CON/SLA/BV-30-C	Accepting Connection Parameter Request - Preferred Anchor Points Only
LL/CON/SLA/BV-31-C	Accepting Connection Parameter Request - Preferred Periodicity
LL/CON/SLA/BV-32-C	Accepting Connection Parameter Request - Preferred Periodicity and Preferred Anchor Points
LL/CON/SLA/BV-33-C	Accepting Connection Parameter Request - Event Masked
LL/CON/SLA/BV-34-C	SLAVE - Accepting Connection Parameter Request - Host Rejects
LL/CON/SLA/BV-40-C	Test that a slave IUT is able to perform the PHY update procedure
LL/CON/SLA/BV-42-C	Test that a slave IUT is able to respond to a PHY update procedure
LL/CON/SLA/BV-43-C	Test that a slave IUT is able to respond to a PHY update procedure when asymmetric links are not supported
LL/CON/SLA/BV-44-C	Test that a slave IUT is able to perform the PHY update procedure when there is a procedure collision between the IUT's PHY change request and the Lower Tester's PHY change request

LL/CON/SLA/BV-45-C	Test that a slave IUT terminates the Link Layer connection if the slave-initiated PHY update procedure is not completed before the procedure response timer expires
LL/CON/SLA/BV-46-C	Test that a slave IUT is able to perform the PHY update procedure when there is a procedure collision between the IUT's PHY change request and the remove device's channel map update
LL/CON/SLA/BV-47-C	Test that a slave IUT is able to perform the PHY update procedure when there is a procedure collision between the IUT's PHY change request and the remote device's connection parameters request
LL/CON/SLA/BV-48-C	Test that a slave IUT is able to perform the PHY update procedure when there is a procedure collision between the IUT's PHY change request and the remote device's connection update request
LL/CON/SLA/BV-49-C	Test that a slave IUT follows all packet time restrictions both during and after PHY change when it initiates the PHY update procedure
LL/CON/SLA/BV-50-C	Test that a slave IUT follows all packet time restrictions both during and after PHY change when it responds to a PHY update procedure from a master device
LL/CON/SLA/BV-51-C	Test that a slave IUT terminates the Link Layer connection if master-initiated PHY update procedure is not completed before the procedure response timer expires
LL/CON/SLA/BV-52-C	Test that a slave IUT follows all packet time restrictions when a PHY update procedure is initiated but no PHY change occurs
LL/CON/SLA/BV-53-C	Test that a slave IUT follows all packet time restrictions both during and after PHY change when it responds to a PHY update procedure from a master device but no PHY change occurs
LL/CON/SLA/BV-54-C	Test that a slave IUT is able to receive data from a master device when the master is transitioning between 125kbit and 500kbit coded rates. Confirm that IUT responds within the allowed T_IFS times for each packet at either coded rate
LL/CON/SLA/BV-55-C	Test that a slave IUT follows all packet time restrictions both during and after PHY change when it initiates the PHY Update Procedure
LL/CON/SLA/BV-56-C	Test that a slave IUT follows all packet time restrictions both during and after PHY change when it responds to a PHY Update Procedure from a master device
LL/CON/SLA/BV-57-C	Test that a slave IUT still transmits data even when the TxTime and/or RxTime values for LE Coded PHY suggest a smaller possible data length than the minimum length data PDU (27 octets)
LL/CON/SLA/BV-58-C	Test that a slave IUT follows all packet time restrictions when a PHY Update Procedure is initiated but no PHY change occurs
LL/CON/SLA/BV-59-C	Test that a slave IUT follows all packet time restrictions both during and after PHY change when it responds to a PHY Update Procedure from a master device but no PHY change occurs
LL/CON/SLA/BV-60-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA – LE 1M PHY
LL/CON/SLA/BV-61-C	Constant Tone Extension Request Procedure, IUT Initiated, Periodic
LL/CON/SLA/BV-62-C	Constant Tone Extension Request Procedure, IUT Initiated, Responses Disabled

LL/CON/SLA/BV-63-C	Verifies that the IUT correctly handles the case where the remote does not support the Connection CTE Response feature.
LL/CON/SLA/BV-64-C	Constant Tone Extension Request Procedure, IUT Initiated, Timeout
LL/CON/SLA/BV-65-C	Constant Tone Extension Request Procedure, IUT Responding, AoA
LL/CON/SLA/BV-66-C	Constant Tone Extension Request Procedure, IUT Responding, Responses Disabled
LL/CON/SLA/BV-67-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD – LE 1M PHY
LL/CON/SLA/BV-68-C	Constant Tone Extension Request Procedure, IUT Responding, AoD
LL/CON/SLA/BV-69-C	Unrequested Constant Tone Extension, IUT Receiving, AoA – LE 1M PHY
LL/CON/SLA/BV-70-C	Unrequested Constant Tone Extension, IUT Receiving, AoD – LE 1M PHY
LL/CON/SLA/BV-71-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA, Encrypted Connection – LE 1M PHY
LL/CON/SLA/BV-72-C	Constant Tone Extension Request Procedure, IUT Responding, AoA, Encrypted Connection
LL/CON/SLA/BV-73-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD, Encrypted Connection – LE 1M PHY
LL/CON/SLA/BV-74-C	Constant Tone Extension Request Procedure, IUT Responding, AoD, Encrypted Connection
LL/CON/SLA/BV-75-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA, Incorrect CRC – LE 1M PHY
LL/CON/SLA/BV-76-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD, Incorrect CRC – LE 1M PHY
LL/CON/SLA/BV-77-C	Verify that the IUT as Slave correctly handles reception of an LL_LENGTH_REQ PDU on the LE 1M PHY
LL/CON/SLA/BV-78-C	Verify that a slave IUT is able to perform the Data Length Update Procedure by sending an LL_LENGTH_REQ PDU on the LE 1M PHY
LL/CON/SLA/BV-79-C	Verify that the IUT as Slave correctly handles communication with a Lower Tester that does not support the Data Length Update Procedure
LL/CON/SLA/BV-80-C	Verify that the IUT as Slave correctly handles reception of an LL_LENGTH_REQ PDU on the LE 2M PHY
LL/CON/SLA/BV-81-C	Verify that a slave IUT is able to perform the Data Length Update Procedure by sending an LL_LENGTH_REQ PDU on the LE 2M PHY
LL/CON/SLA/BV-82-C	Verify that the IUT as Slave correctly handles reception of an LL_LENGTH_REQ PDU on the LE Coded PHY
LL/CON/SLA/BV-83-C	Verify that a slave IUT is able to perform the Data Length Update Procedure by sending an LL_LENGTH_REQ PDU on the LE Coded PHY
LL/CON/SLA/BV-84-C	Verify that the IUT as Slave correctly handles communication with a Lower Tester that does not support the Data Length Update Procedure on LE Coded PHY
LL/CON/SLA/BV-85-C	Test that a slave IUT is able to perform the connection parameter request procedure when a feature exchange has not been performed and the remote device does not support the request
LL/CON/SLA/BV-86-C	Test that a slave IUT is able to reject the connection parameter request procedure after the feature exchange reveals that the remote device does not support the request

LL/CON/SLA/BV-87-C	Constant Tone Extension Request Procedure, IUT Responding, Unsupported
LL/CON/SLA/BV-88-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/SLA/BV-89-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/SLA/BV-90-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/SLA/BV-91-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/SLA/BV-92-C	Periodic Advertising Sync Transfer Procedure, Advertising IUT Initiated
LL/CON/SLA/BV-93-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/SLA/BV-94-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/SLA/BV-95-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/SLA/BV-96-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/SLA/BV-97-C	Periodic Advertising Sync Transfer Procedure, Synchronized IUT Initiated
LL/CON/SLA/BV-98-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/SLA/BV-99-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/SLA/BV-100-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/SLA/BV-101-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/SLA/BV-102-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different PHYs
LL/CON/SLA/BV-103-C	Periodic Advertising Sync Transfer Procedure, Accepting – Skipping Events
LL/CON/SLA/BV-104-C	Periodic Advertising Sync Transfer Procedure, Accepting – Already Synchronized
LL/CON/SLA/BV-105-C	Periodic Advertising Sync Transfer Procedure, Accepting – Extreme Timings
LL/CON/SLA/BV-106-C	Periodic Advertising Sync Transfer Procedure, Accepting – Synchronization Failure
LL/CON/SLA/BV-107-C	Periodic Advertising Sync Transfer Procedure, Accepting – Different Modes and Addresses
LL/CON/SLA/BV-108-C	Periodic Advertising Sync Transfer Procedure, Accepting, Changing Transfer Mode During Synchronization
LL/CON/SLA/BV-109-C	Acknowledging Long Control PDUs
LL/CON/SLA/BV-110-C	Acknowledging Long Control PDUs
LL/CON/SLA/BV-111-C	Acknowledging Long Control PDUs
LL/CON/SLA/BV-112-C	Rejecting Request to Send Long Control PDUs before Feature Exchange – LE 1M PHY
LL/CON/SLA/BV-113-C	Rejecting Request to Send Long Control PDUs before Feature Exchange – LE 2M PHY
LL/CON/SLA/BV-114-C	Rejecting Request to Send Long Control PDUs before Feature Exchange – LE Coded PHY
LL/CON/SLA/BV-115-C	Rejecting Request to Send Long Control PDUs after Feature Exchange – LE 1M PHY
LL/CON/SLA/BV-116-C	Rejecting Request to Send Long Control PDUs after Feature Exchange – LE 2M PHY
LL/CON/SLA/BV-117-C	Rejecting Request to Send Long Control PDUs after Feature Exchange – LE Coded PHY
LL/CON/SLA/BV-118-C	Sending Long Control PDUs after Feature Exchange – LE 1M PHY
LL/CON/SLA/BV-119-C	Sending Long Control PDUs after Feature Exchange – LE 2M PHY
LL/CON/SLA/BV-120-C	Sending Long Control PDUs after Feature Exchange – LE Coded PHY

LL/CON/SLA/BV-121-C	Unrequested Constant Tone Extension, IUT Receiving, AoD – LE 2M PHY
LL/CON/SLA/BV-122-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA – LE 2M PHY
LL/CON/SLA/BV-123-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD – LE 2M PHY
LL/CON/SLA/BV-124-C	Unrequested Constant Tone Extension, IUT Receiving, AoA – LE 2M PHY
LL/CON/SLA/BV-125-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA, Encrypted Connection – LE 2M PHY
LL/CON/SLA/BV-126-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD, Encrypted Connection – LE 2M PHY
LL/CON/SLA/BV-127-C	Constant Tone Extension Request Procedure, IUT Initiated, AoA, Incorrect CRC – LE 2M PHY
LL/CON/SLA/BV-128-C	Constant Tone Extension Request Procedure, IUT Initiated, AoD, Incorrect CRC – LE 2M PHY
LL/CON/SLA/BV-129-C	Data Length Update – Preserve Parameters After a PHY Change – LE 2M PHY
LL/CON/SLA/BV-130-C	Data Length Update – Preserve Parameters After a PHY Change – LE Coded PHY
LL/CON/SLA/BV-131-C	Data Length Update – Retransmission During an Update
LL/CON/SLA/BV-132-C	Data Length Update – Peer Does Not Support LE Coded PHY – supportedMaxTxTime
LL/CON/SLA/BV-134-C	Verify that an IUT stops sending CTE requests after changing to a PHY that doesn't allow Constant Tone Extensions
LL/DDI/ADV/BI-01-C	Tests that an advertiser IUT ignores a scan request with an invalid checksum and continues advertising
LL/DDI/ADV/BI-02-C	Tests that an advertiser IUT ignores connection indications with an invalid CRC
LL/DDI/ADV/BI-05-C	Disallow Extended Advertising PDU sizes for Legacy Advertising when advertising enabled
LL/DDI/ADV/BI-06-C	Disallow Extended Advertising PDU sizes for Scannable Legacy Advertising when advertising enabled
LL/DDI/ADV/BV-01-C	Non-Connectable Advertising Events
LL/DDI/ADV/BV-02-C	ADVERTISING - Undirected Advertising Events
LL/DDI/ADV/BV-03-C	ADVERTISING - Advertising Data: Non-Connectable
LL/DDI/ADV/BV-04-C	ADVERTISING - Advertising Data: Undirected
LL/DDI/ADV/BV-05-C	Scan Request: Undirected Connectable
LL/DDI/ADV/BV-06-C	Tests that an advertiser IUT receives a connection indication and stops advertising after its reception
LL/DDI/ADV/BV-07-C	ADVERTISING - Scan Request Connection Indication
LL/DDI/ADV/BV-08-C	ADVERTISING - Scan Request Device Filtering
LL/DDI/ADV/BV-09-C	ADVERTISING - Connection Indication Device Filtering
LL/DDI/ADV/BV-11-C	ADVERTISING - Directed Advertising Events
LL/DDI/ADV/BV-15-C	ADVERTISING - Discoverable Advertising Events
LL/DDI/ADV/BV-16-C	ADVERTISING - Advertising Data: Discoverable
LL/DDI/ADV/BV-17-C	ADVERTISING - Scan Request: Discoverable

LL/DDI/ADV/BV-18-C	ADVERTISING - Device Filtering: Discoverable
LL/DDI/ADV/BV-19-C	Low Duty Cycle Directed Advertising Events
LL/DDI/ADV/BV-20-C	Test that an advertiser IUT sends advertising packets using the 1 Ms/s PHY
LL/DDI/ADV/BV-21-C	Tests that an advertiser IUT sends advertising packets of a non-connectable event type with data on all advertising channels using legacy PDU types and extended advertising HCI commands
LL/DDI/ADV/BV-22-C	Extended Advertising, Legacy PDUs, Undirected, CSA #1
LL/DDI/ADV/BV-25-C	Tests that an advertiser IUT sends scannable ADV_EXT_IND PDUs with the AuxPtr field referring to a valid AUX_ADV_IND PDU on the secondary advertising channel with the correct payload fields timing and channel sequence for the maximum time allowed
LL/DDI/ADV/BV-26-C	Extended Advertising, Periodic Advertising – LE 1M PHY
LL/DDI/ADV/BV-27-C	Tests that an advertiser IUT sends non-connectable undirected advertising packets with the ADV_EXT_IND PDU on the primary advertising channel with the correct payload fields timing and channel sequence for the maximum time allowed
LL/DDI/ADV/BV-28-C	Tests that an advertiser IUT sends ADV_EXT_IND PDUs with the AuxPtr field referring to a valid AUX_ADV_IND PDU on the secondary advertising channel. Proper handling of the Secondary_Advertising_Max_Skip parameter is tested
LL/DDI/ADV/BV-29-C	Tests that an advertiser IUT can support multiple advertising sets using the LE 1M PHY with the correct payload fields timing and channel sequence for the maximum time allowed
LL/DDI/ADV/BV-30-C	Tests that an advertiser IUT can support multiple advertising sets using the LE Coded PHY with the correct payload fields timing and channel sequence for the maximum time allowed
LL/DDI/ADV/BV-31-C	Tests that an advertiser IUT can support multiple advertising sets using both the LE 1M and the LE Coded PHYs with the correct payload fields timing and channel sequence for the maximum time allowed
LL/DDI/ADV/BV-32-C	Tests that an advertiser IUT can support multiple advertising sets using both legacy and extended advertising PDUs in parallel with the correct payload fields timing and channel sequence for the maximum time allowed
LL/DDI/ADV/BV-33-C	Tests that an advertiser IUT can support multiple periodic advertising sets
LL/DDI/ADV/BV-34-C	Tests that an advertiser IUT can report the TX Power in advertisements with RF path compensation using correct payload fields timing and channel sequence for the maximum time allowed
LL/DDI/ADV/BV-35-C	Tests that an advertiser IUT can support multiple advertising sets with the correct payload fields timing and channel sequence for the maximum time allowed. Advertisements with the minimum data required to be supported are tested
LL/DDI/ADV/BV-36-C	AoD Connectionless CTE Advertising – LE 1M PHY, 2 µs slots
LL/DDI/ADV/BV-37-C	AoA Connectionless CTE Advertising – LE 1M PHY
LL/DDI/ADV/BV-39-C	Connectionless CTE Advertising – Maintain CTE Configuration
LL/DDI/ADV/BV-43-C	Periodic Advertising validating SyncInfo fields
LL/DDI/ADV/BV-45-C	Tests that an advertiser IUT sends scannable ADV_EXT_IND PDUs with the AuxPtr field referring to a valid AUX_ADV_IND PDU on the secondary

	advertising channel with the correct payload fields, timing, and channel sequence for the maximum time allowed. Tests that an advertiser IUT responds to a scan request on the secondary channel and continues advertising after the response. Scan response data chaining is tested. Undirected and Directed events are tested.
LL/DDI/ADV/BV-47-C	Tests that an advertiser IUT using LE 1M PHY sends non-connectable ADV_EXT_IND PDUs with the AuxPtr field referring to a valid AUX_ADV_IND PDU on the secondary advertising channel with the correct payload fields, timing, and channel sequence for the maximum time allowed. Advertisements with and without data, along with chaining, are tested. Undirected and Directed events are tested.
LL/DDI/ADV/BV-48-C	Tests that an advertiser IUT using LE Coded PHY sends non-connectable ADV_EXT_IND PDUs with the AuxPtr field referring to a valid AUX_ADV_IND PDU on the secondary advertising channel with the correct payload fields, timing, and channel sequence for the maximum time allowed. Advertisements with and without data, along with chaining, are tested. Undirected and Directed events are tested.
LL/DDI/ADV/BV-49-C	Tests that an advertiser IUT using LE 2M PHY sends non-connectable ADV_EXT_IND PDUs with the AuxPtr field referring to a valid AUX_ADV_IND PDU on the secondary advertising channel with the correct payload fields, timing, and channel sequence for the maximum time allowed. Advertisements with and without data, along with chaining, are tested. Undirected and Directed events are tested.
LL/DDI/ADV/BV-50-C	Extended Advertising, Legacy PDUs, Undirected, CSA #2
LL/DDI/ADV/BV-51-C	Extended Advertising, Scannable – without ADI – LE 2M PHY
LL/DDI/ADV/BV-52-C	Extended Advertising, Scannable – with ADI – LE 2M PHY
LL/DDI/ADV/BV-53-C	Extended Advertising, Scannable – without ADI – LE Coded PHY
LL/DDI/ADV/BV-54-C	Extended Advertising, Scannable – with ADI – LE Coded PHY
LL/DDI/ADV/BV-55-C	Extended Advertising, Periodic Advertising – LE 2M PHY
LL/DDI/ADV/BV-56-C	Extended Advertising, Periodic Advertising – LE Coded PHY
LL/DDI/ADV/BV-57-C	AoD Connectionless CTE Advertising – LE 2M PHY, 2 µs slots, *121)
LL/DDI/ADV/BV-58-C	AoD Connectionless CTE Advertising – LE 1M PHY, 1 µs slots, *121)
LL/DDI/ADV/BV-59-C	AoD Connectionless CTE Advertising – LE 2M PHY, 1 µs slots, *121)
LL/DDI/ADV/BV-60-C	AoA Connectionless CTE Advertising – LE 2M PHY, *122)
LL/DDI/ADV/BV-61-C	Extended Advertising, Periodic Advertising with TxPower
LL/DDI/ADV/BV-62-C	Periodic Advertising, Channel Map Update
LL/DDI/SCN/BI-01-C	Active Scanning Invalid CRC
LL/DDI/SCN/BI-02-C	Passive Scanning Invalid CRC
LL/DDI/SCN/BI-03-C	Privacy – Active Scanning, Wrong AdvA in Response
LL/DDI/SCN/BV-01-C	Passive Scanning: Non Connectable
LL/DDI/SCN/BV-02-C	Passive Scanning Device Filtering
LL/DDI/SCN/BV-03-C	Tests that a scanner IUT detects and requests additional information from advertisers and reports the results from the Controller

LL/DDI/SCN/BV-04-C	Tests that a scanner IUT detects requests and reports additional information about a single advertiser according to the filtering policy and type of advertising event used
LL/DDI/SCN/BV-05-C	Tests that a scanner IUT detects devices using different types of advertising events when scanning actively and not filtering devices
LL/DDI/SCN/BV-10-C	Tests that a scanner IUT detects and reports advertising packets correctly
LL/DDI/SCN/BV-11-C	Tests that a scanner IUT detects and reports advertising packets correctly
LL/DDI/SCN/BV-12-C	Tests that a scanner IUT detects and reports advertising packets correctly
LL/DDI/SCN/BV-13-C	Verify the IUT when doing passive scanning and using the RL reports advertising from the LT
LL/DDI/SCN/BV-14-C	Verify that a scanner IUT detects and reports directed advertising packets correctly when the UT has set the scan filter policy to 0x03 or 0x04
LL/DDI/SCN/BV-15-C	Verify that the IUT when doing active scanning reports the LT and sends SCAN_REQs to the LT with a NRPA for the ScanA field
LL/DDI/SCN/BV-16-C	Verify that the IUT when doing active scanning and using the RL reports the LT and sends SCAN_REQs to the LT with a RPA for the ScanA field
LL/DDI/SCN/BV-17-C	Verify that the IUT when doing active scanning and using the RL reports the LT and sends SCAN_REQs to the lower tester with a NRPA for the ScanA field
LL/DDI/SCN/BV-18-C	Verify that the IUT when doing active scanning and using the RL reports the LT and sends SCAN_RESs to the LT with a RPA for the ScanA field
LL/DDI/SCN/BV-19-C	Extended Scanning, Passive – LE 1M PHY
LL/DDI/SCN/BV-20-C	Extended Scanning, Active – LE 1M PHY, Core 5.0
LL/DDI/SCN/BV-21-C	Extended Scanning, Periodic Advertising Reception – LE 1M PHY
LL/DDI/SCN/BV-23-C	Tests that a scanner IUT detects and reports advertising packets received on all supported PHYs correctly
LL/DDI/SCN/BV-24-C	Extended Scanning, Multiple Sets, Active, Multiple PHYs (All Supported PHYs), Core 5.0
LL/DDI/SCN/BV-25-C	Tests that a scanner IUT can locate and receive periodic advertising events on all supported PHYs and reports the results from the Controller
LL/DDI/SCN/BV-26-C	Verify the IUT when doing passive scanning and using the Resolving List does not report advertising from the Lower Tester using its device identity address when the identity address and an associated IRK are in the resolving list
LL/DDI/SCN/BV-28-C	Verify the IUT when doing passive scanning and using the Resolving List reports advertising from the Lower Tester using its device identity address when the identity address and an associated IRK are in the resolving list using device privacy mode
LL/DDI/SCN/BV-29-C	AoD Connectionless CTE Scanning – LE 1M PHY, 2 µs slots
LL/DDI/SCN/BV-30-C	AoA Connectionless CTE Scanning – LE 1M PHY, 2 µs slots
LL/DDI/SCN/BV-31-C	AoD Connectionless CTE Scanning, Incorrect CRC – LE 1M PHY, 2 µs slots
LL/DDI/SCN/BV-32-C	AoA Connectionless CTE Scanning, Incorrect CRC – LE 1M PHY, 2 µs slots
LL/DDI/SCN/BV-33-C	Privacy - Extended Scanning, Active, Core 5.0
LL/DDI/SCN/BV-34-C	Tests that a scanner IUT can synchronize to periodic advertising events using both periodic sync establishment filter policy settings, and ignoring the scanner filter policy

LL/DDI/SCN/BV-35-C	Connectionless CTE Scanning, Filter Wrong CTE Types on Synchronization
LL/DDI/SCN/BV-36-C	Connectionless CTE Scanning, CTE Type Change
LL/DDI/SCN/BV-37-C	Tests that synchronization will fail on the IUT when an AUX_SYNC_IND PDU is not received within 6 periodic advertising events after the first advertising event is sent
LL/DDI/SCN/BV-38-C	Extended Scanning, Periodic Advertising Reception, Reporting Initially Disabled – LE 1M PHY
LL/DDI/SCN/BV-42-C	Extended Scanning, Passive – LE 2M PHY
LL/DDI/SCN/BV-43-C	Extended Scanning, Passive – LE Coded PHY
LL/DDI/SCN/BV-44-C	Extended Scanning, Active – LE 2M Phy, Core 5.0
LL/DDI/SCN/BV-45-C	Extended Scanning, Active – LE Coded PHY, Core 5.0
LL/DDI/SCN/BV-46-C	Extended Scanning, Periodic Advertising Reception – LE 2M PHY
LL/DDI/SCN/BV-47-C	Extended Scanning, Periodic Advertising Reception – LE Coded PHY
LL/DDI/SCN/BV-48-C	AoD Connectionless CTE Scanning – LE 2M PHY, 2 µs slots
LL/DDI/SCN/BV-49-C	AoD Connectionless CTE Scanning – LE 1M PHY, 1 µs slots
LL/DDI/SCN/BV-50-C	AoD Connectionless CTE Scanning – LE 2M PHY, 1 µs slots
LL/DDI/SCN/BV-51-C	AoA Connectionless CTE Scanning – LE 2M PHY, 2 µs slots
LL/DDI/SCN/BV-52-C	AoA Connectionless CTE Scanning – LE 1M PHY, 1 µs slots
LL/DDI/SCN/BV-53-C	AoA Connectionless CTE Scanning – LE 2M PHY, 1 µs slots
LL/DDI/SCN/BV-54-C	AoD Connectionless CTE Scanning, Incorrect CRC – LE 2M PHY, 2 µs slots
LL/DDI/SCN/BV-55-C	AoD Connectionless CTE Scanning, Incorrect CRC – LE 1M PHY, 1 µs slots
LL/DDI/SCN/BV-56-C	AoD Connectionless CTE Scanning, Incorrect CRC – LE 2M PHY, 1 µs slots
LL/DDI/SCN/BV-57-C	AoA Connectionless CTE Scanning, Incorrect CRC – LE 2M PHY, 2 µs slots
LL/DDI/SCN/BV-58-C	AoA Connectionless CTE Scanning, Incorrect CRC – LE 1M PHY, 1 µs slots
LL/DDI/SCN/BV-59-C	AoA Connectionless CTE Scanning, Incorrect CRC – LE 2M PHY, 1 µs slots
LL/DDI/SCN/BV-60-C	Extended Scanning, Periodic Advertising Reception, Reporting Initially Disabled – LE 2M PHY
LL/DDI/SCN/BV-61-C	Extended Scanning, Periodic Advertising Reception, Reporting Initially Disabled – LE Coded PHY
LL/DDI/SCN/BV-62-C	Extended Scanning, Multiple Sets, Active, Multiple PHYs (All Supported PHYs), Core 5.1
LL/DDI/SCN/BV-63-C	Privacy - Extended Scanning, Active, Core 5.1
LL/DDI/SCN/BV-64-C	Extended Scanning, Active – LE 1M PHY, Core 5.1
LL/DDI/SCN/BV-65-C	Extended Scanning, Active – LE 2M Phy, Core 5.1
LL/DDI/SCN/BV-66-C	Extended Scanning, Active – LE Coded PHY, Core 5.1
LL/DDI/SCN/BV-67-C	Periodic Advertising Reception, Channel Map Update
LL/DFL/MAS/BV-01	Test that a master IUT correctly transmits packets with fragmented L2CAP headers.
LL/DFL/MAS/BV-02	Test that a master IUT correctly receives packets with fragmented L2CAP headers.
LL/DFL/SLA/BV-01	Test that a slave IUT correctly transmits packets with fragmented L2CAP headers.
LL/DFL/SLA/BV-02	Test that a slave IUT correctly receives packets with fragmented L2CAP headers.

LL/ENC/ADV/BI-01-C	Scan Request Invalid Address
LL/ENC/ADV/BI-02-C	Master Packets Invalid Address
LL/ENC/INI/BI-01-C	Slave Packets Invalid Address
LL/ENC/MAS/BI-01-C	Tests that a master IUT ignores packets not belonging to the connection transmitted using a different access address
LL/ENC/SCN/BI-01-C	Passive Scanning Invalid Address
LL/ENC/SCN/BI-02-C	Active Scanning Invalid Address
LL/ENC/SLA/BI-01-C	Tests that a slave IUT ignores a packet starting an event belonging to a different connection
LL/FRH/ADV/BV-01-C	ADVERTISING/SLAVE - Accepting Connections With Hop Lengths
LL/FRH/MAS/BV-01-C	MASTER - Requesting Channel Map Update
LL/FRH/MAS/BV-02-C	Tests that a master IUT performs the channel map update procedure while using Channel Selection Algorithm #2
LL/FRH/MAS/BV-03-C	Tests that a master IUT performs the Minimum Number Of Used Channels Procedure
LL/FRH/SLA/BV-01-C	Test that a slave IUT accepts a channel map update request from the master and adopts the new channel map at the correct time is able to maintain the connection
LL/FRH/SLA/BV-02-C	Tests that a slave IUT accepts a channel map update request from the master while using Channel Selection Algorithm #2 adopts the new channel map at the correct time and maintains the connection
LL/IST/BRD/BV-01-C $_1$	ISO Transmit Test Mode, BIS
LL/IST/MAS/BV-01-C	ISO Transmit Test Mode, CIS – Master
LL/IST/MAS/BV-03-C $_1$	ISO Receive Test Mode, CIS – Master
LL/IST/MAS/BV-05-C $_1$	ISO Receive Test Mode missing PDU – Master
LL/IST/SLA/BV-01-C	ISO Transmit Test Mode, CIS – Slave
LL/IST/SLA/BV-03-C $_1$	ISO Receive Test Mode, CIS – Slave
LL/IST/SLA/BV-05-C $_1$	ISO Receive Test Mode missing PDU – Slave
LL/IST/SNC/BV-01-C $_1$	ISO Receive Test Mode, BIS
LL/PAC/MAS/BI-01-C	Tests that a master IUT correctly handles invalid LL Control PDUs
LL/PAC/MAS/BV-01-C	Test whether a master IUT responds with the unknown response packet to a device transmitting a control packet not in the supported specification or not supported by the IUT
LL/PAC/SLA/BI-01-C	Tests that a slave IUT correctly handles invalid LL Control PDUs
LL/PAC/SLA/BV-01-C	Test that a slave IUT responds with the unknown response packet to a device transmitting a control packet not in the supported specification or not supported by the IUT
LL/PCL/MAS/BI-01-C	Power Control Request using an unsupported PHY – Master
LL/PCL/MAS/BV-01-C	Path Loss Monitoring – Master
LL/PCL/MAS/BV-03-C*	Power Control Request – LE 1M PHY – Initiate, Master
LL/PCL/MAS/BV-04-C*	Power Control Request – LE 2M PHY – Initiate, Master
LL/PCL/MAS/BV-05-C*$_1$	Power Control Request – LE Coded PHY – Initiate, Master
LL/PCL/MAS/BV-08-C	Power Control Response – LE 1M PHY – Master
LL/PCL/MAS/BV-09-C	Power Control Response – LE 2M PHY – Master

LL/PCL/MAS/BV-10-C	Power Control Response – LE Coded PHY S=8 – Master
LL/PCL/MAS/BV-11-C	Power Control Response – LE Coded PHY S=2 – Master
LL/PCL/MAS/BV-12-C*	Power Control Response, Min and Max Power Level Reached – Master
LL/PCL/MAS/BV-16-C	Set Acceptable Power Reduction Value – Master
LL/PCL/MAS/BV-17-C*	Properly handle a Power Request PDU when waiting for a Power Response PDU – Master
LL/PCL/MAS/BV-20-C*$_1$	Power Control Request – LE 1M PHY – CIS, Initiate, Master
LL/PCL/MAS/BV-23-C*$_1$	Power Control Request – LE Coded PHY – CIS, Initiate, Master
LL/PCL/MAS/BV-25-C	Power Control Response – LE 1M PHY – CIS, Master
LL/PCL/MAS/BV-27-C	Power Control Response – LE Coded PHY S=8 – CIS, Master
LL/PCL/MAS/BV-33-C	Power Control Response with RF Path Compensation – LE 1M PHY – Master
LL/PCL/MAS/BV-34-C	Power Control Response with RF Path Compensation – LE 2M PHY – Master
LL/PCL/MAS/BV-35-C	Power Control Response with RF Path Compensation – LE Coded PHY S=8 – Master
LL/PCL/MAS/BV-36-C	Power Control Response with RF Path Compensation – LE Coded PHY S=2 – Master
LL/PCL/MAS/BV-37-C$_1$	Power Change Indication on PHY Change, LE 2M PHY, Master
LL/PCL/MAS/BV-38-C$_1$	Power Change Indication on PHY Change, LE Coded PHY, Master
LL/PCL/MAS/BV-40-C	Max and Min Power Level Response at Max and Min Power – Master
LL/PCL/MAS/BV-41-C$_1$	Power Change Indication on PHY Change, LE 2M to LE 1M PHY, Master
LL/PCL/MAS/BV-42-C$_1$	Power Change Indication on PHY Change, LE 2M to LE Coded PHY, Master
LL/PCL/MAS/BV-43-C$_1$	Power Change Indication on PHY Change, LE Coded to LE 1M PHY, Master
LL/PCL/MAS/BV-44-C$_1$	Power Change Indication on PHY Change, LE Coded to LE 2M PHY, Master
LL/PCL/MAS/BV-45-C*	Power Control Request – LE 2M PHY – CIS, Initiate, Master
LL/PCL/MAS/BV-46-C	Power Control Response – LE 2M PHY – CIS, Master
LL/PCL/MAS/BV-47-C*	Power Control Request – LE Coded PHY S=2 – Initiate, Master
LL/PCL/MAS/BV-48-C*$_1$	Power Control Request – LE Coded PHY S=2 – CIS, Initiate, Master
LL/PCL/SLA/BI-01-C	Power Control Request using an unsupported PHY – Slave
LL/PCL/SLA/BV-01-C	Path Loss Monitoring – Slave
LL/PCL/SLA/BV-03-C*	Power Control Request – LE 1M PHY – Initiate, Slave
LL/PCL/SLA/BV-04-C*	Power Control Request – LE 2M PHY – Initiate, Slave
LL/PCL/SLA/BV-05-C*$_1$	Power Control Request – LE Coded PHY – Initiate, Slave
LL/PCL/SLA/BV-08-C	Power Control Response – LE 1M PHY – Slave
LL/PCL/SLA/BV-09-C	Power Control Response – LE 2M PHY – Slave
LL/PCL/SLA/BV-10-C	Power Control Response – LE Coded PHY S=8 – Slave
LL/PCL/SLA/BV-11-C	Power Control Response – LE Coded PHY S=2 – Slave
LL/PCL/SLA/BV-12-C*	Power Control Response, Min and Max Power Level Reached – Slave
LL/PCL/SLA/BV-16-C	Set Acceptable Power Reduction Value – Slave
LL/PCL/SLA/BV-17-C*	Properly handle a Power Request PDU when waiting for a Power Response PDU – Slave
LL/PCL/SLA/BV-20-C*$_1$	Power Control Request – LE 1M PHY – CIS, Initiate, Slave
LL/PCL/SLA/BV-22-C*$_1$	Power Control Request – LE Coded PHY – CIS, Initiate, Slave

LL/PCL/SLA/BV-25-C	Power Control Response – LE 1M PHY – CIS, Slave
LL/PCL/SLA/BV-28-C$_1$	Power Control Response – LE Coded PHY S=2 – CIS, Slave
LL/PCL/SLA/BV-29-C	Remote Power Transmit Level Request – LE 1M PHY – Initiate, Slave
LL/PCL/SLA/BV-33-C	Power Control Response with RF Path Compensation – LE 1M PHY – Slave
LL/PCL/SLA/BV-34-C	Power Control Response with RF Path Compensation – LE 2M PHY – Slave
LL/PCL/SLA/BV-35-C	Power Control Response with RF Path Compensation – LE Coded PHY S=8 – Slave
LL/PCL/SLA/BV-36-C	Power Control Response with RF Path Compensation – LE Coded PHY S=2 – Slave
LL/PCL/SLA/BV-37-C$_1$	Power Change Indication on PHY Change, LE 2M PHY, Slave
LL/PCL/SLA/BV-38-C$_1$	Power Change Indication on PHY Change, LE Coded PHY, Slave
LL/PCL/SLA/BV-40-C	Max and Min Power Level Response at Max and Min Power – Slave
LL/PCL/SLA/BV-41-C$_1$	Power Change Indication on PHY Change, LE 2M to LE 1M PHY, Slave
LL/PCL/SLA/BV-42-C$_1$	Power Change Indication on PHY Change, LE 2M to LE Coded PHY, Slave
LL/PCL/SLA/BV-43-C$_1$	Power Change Indication on PHY Change, LE Coded to LE 1M PHY, Slave
LL/PCL/SLA/BV-44-C$_1$	Power Change Indication on PHY Change, LE Coded to LE 2M PHY, Slave
LL/PCL/SLA/BV-45-C*	Power Control Request – LE 2M PHY – CIS, Initiate, Slave
LL/PCL/SLA/BV-46-C	Power Control Response – LE 2M PHY – CIS, Slave
LL/PCL/SLA/BV-47-C*	Power Control Request – LE Coded PHY S=2 – Initiate, Slave
LL/PCL/SLA/BV-48-C*$_1$	Power Control Request – LE Coded PHY S=2 – CIS, Initiate, Slave
LL/SEC/ADV/BV-01-C	Advertising With Encrypted Address
LL/SEC/ADV/BV-02-C	Verify that an advertiser IUT is able to advertise non-connectable events using a non-resolvable private address
LL/SEC/ADV/BV-03-C	Verify that an advertiser IUT is able to advertise non-connectable events using a resolvable private address and that the address is refreshed
LL/SEC/ADV/BV-04-C	Verify that an adv IUT is able to adv scan undir events using a NRPA
LL/SEC/ADV/BV-05-C	Verify that an adv IUT is able to adv scan undir events using a RPA
LL/SEC/ADV/BV-06-C	Test that an adv IUT can conn while using a NRPA in the AdvA field
LL/SEC/ADV/BV-07-C	Verify that an adv IUT can conn while using the RL and using a RPA in the AdvA
LL/SEC/ADV/BV-08-C	Verify the IUT when transmitting undir conn adv events utsing the RL and using a RPA for the AdvA field connects to the LT
LL/SEC/ADV/BV-09-C	Verify that the IUT connects to the LT when transmitting undir conn adv events and using the RL with a public or random static addr for AdvA field
LL/SEC/ADV/BV-10-C	Verify that the IUT, when transmitting undir conn adv events and using the RL connects to the devices that are only resolved and on the WL
LL/SEC/ADV/BV-11-C	Verify that the IUT when transmitting dir conn adv events is using RPA for AdvA and InitA fields when the LT has distributed its own IRK
LL/SEC/ADV/BV-12-C	Verify that the IUT when transmitting dir conn av events is using RPA for AdvA field and a ID addr for the InitA field when the LT has not distributed its own IRK
LL/SEC/ADV/BV-13-C	Verify the IUT when transmitting dir conn adv events using a public or static addr for AdvA field and a RPA for the InitA field when the LT has distributed its own IRK

LL/SEC/ADV/BV-14-C	Verify the IUT when transmitting directed connectable advertising events and using the Resolving List connects to the devices that are only in the resolving list. The IUT should only connect to a Lower Tester upon successful resolution of the peer's resolvable private address
LL/SEC/ADV/BV-15-C	Verify that an advertiser IUT does not respond to a scan request with the scanner identity address when the IUT has that address and an associated IRK in the resolving list using network privacy mode
LL/SEC/ADV/BV-16-C	Verify that the IUT when transmitting undirected connectable advertising events does not connect in response to connect requests with the initiator identity address when the IUT has that address and an associated IRK in the resolving list using network privacy mode
LL/SEC/ADV/BV-17-C	Verify that the IUT when transmitting directed connectable advertising events does not connect in response to connect requests with the initiator identity address when the IUT has that address and an associated IRK in the resolving list using network privacy mode
LL/SEC/ADV/BV-18-C	Verify that an advertiser IUT responds to a scan request with the scanner identity address when the IUT has that address and an associated IRK in the resolving list using device privacy mode
LL/SEC/ADV/BV-19-C	Verify that the IUT when transmitting undirected connectable advertising events connects in response to connect requests with the initiator identity address when the IUT has that address and an associated IRK in the resolving list using device privacy mode
LL/SEC/ADV/BV-20-C	Verify that the IUT when transmitting directed connectable advertising events connects in response to connect requests with the initiator identity address when the IUT has that address and an associated IRK in the resolving list using device privacy mode
LL/SEC/ADV/BV-21-C	Network Privacy - Scannable Advertising, resolvable private address, Ignore scanner RPA
LL/SEC/ADV/BV-22-C	Network Privacy – Directed Connectable Advertising using Target RPA as InitA
LL/SEC/MAS/BI-01-C	Master Encryption Setup: Missing Response
LL/SEC/MAS/BI-03-C	Master Encryption Setup: Missing Request
LL/SEC/MAS/BI-04-C	Master Encryption Setup: Missing Acknowledgement
LL/SEC/MAS/BI-05-C	Master MIC Failure: Corrupted MIC
LL/SEC/MAS/BI-06-C	Master MIC Failure: Corrupted Header
LL/SEC/MAS/BI-07-C	Master Pause Encryption Sending Data
LL/SEC/MAS/BI-08-C	Master Encryption: Sending Data and Not Response
LL/SEC/MAS/BI-09-C	Master Encryption: Sending Data and Not Request
LL/SEC/MAS/BV-01-C	Master Encryption Mode Setup
LL/SEC/MAS/BV-02-C	Master Pause Encryption
LL/SEC/MAS/BV-03-C	Master Receiving LL_REJECT_IND
LL/SEC/MAS/BV-04-C	Master Encryption: Sending Data Before LL_ENC_RSP
LL/SEC/MAS/BV-05-C	Master Pause Encryption: Sending Data Before LL_PAUSE_ENC_RSP
LL/SEC/MAS/BV-06-C	LE Authenticated Payload Timeout Timer (2)
LL/SEC/MAS/BV-07-C	LE Ping Procedure (2)

LL/SEC/MAS/BV-08-C	LE Authenticated Payload Timeout Timer (2)
LL/SEC/MAS/BV-09-C	LE Authenticated Payload Timeout Timer (2)
LL/SEC/MAS/BV-10-C	LE Authenticated Payload Timeout Timer (2)
LL/SEC/MAS/BV-11-C	Master Sending REJECT_EXT_IND
LL/SEC/MAS/BV-12-C	Master Start Encryption: Overlapping Procedure
LL/SEC/MAS/BV-13-C	Master Start Encryption: Overlapping Procedure With LL_SLAVE_FEATURES_REQ
LL/SEC/MAS/BV-14-C	Master Receiving unexpected PDU during encryption start
LL/SEC/SCN/BV-01-C	Private Address Scanning
LL/SEC/SLA/BI-01-C	Slave Encryption Setup: Missing Response
LL/SEC/SLA/BI-03-C	Slave MIC Failure: Corrupted MIC
LL/SEC/SLA/BI-04-C	Slave MIC Failure: Corrupted Header
LL/SEC/SLA/BI-05-C	Slave Receiving Unexpected Data Channel PDU During Encryption Start
LL/SEC/SLA/BV-01-C	Slave Encryption Mode Setup
LL/SEC/SLA/BV-02-C	Slave Pause Encryption
LL/SEC/SLA/BV-03-C	Slave Pause Encryption Sending Data
LL/SEC/SLA/BV-04-C	Slave Sending LL_REJECT_IND
LL/SEC/SLA/BV-05-C	Slave Receiving Encrypted Data
LL/SEC/SLA/BV-06-C	LE Authenticated Payload Timeout Timer
LL/SEC/SLA/BV-07-C	LE Ping Procedure
LL/SEC/SLA/BV-08-C	LE Authenticated Payload Timeout Timer
LL/SEC/SLA/BV-09-C	LE Authenticated Payload Timeout Timer
LL/SEC/SLA/BV-10-C	LE Authenticated Payload Timeout Timer
LL/SEC/SLA/BV-11-C	Slave Sending REJECT_EXT_IND
LL/TIM/ADV/BV-01-C	Test that an advertiser IUT responds to a scan request sent using the minimum timing between packets (T_IFS-1.5 usec)
LL/TIM/ADV/BV-02-C	Test that an advertiser IUT responds to a scan request sent using the maximum timing between packets (T_IFS+1.5 usec)
LL/TIM/ADV/BV-03-C	Extended Advertising, Secondary Channel, Earliest Transmission to Advertiser – LE 1M PHY
LL/TIM/ADV/BV-04-C	Extended Advertising, Secondary Channel, Latest Transmission to Advertiser – LE 1M PHY
LL/TIM/ADV/BV-05-C	Extended Advertising, Secondary Channel, Earliest Transmission to Advertiser – LE 2M PHY
LL/TIM/ADV/BV-06-C	Extended Advertising, Secondary Channel, Earliest Transmission to Advertiser – LE Coded PHY
LL/TIM/ADV/BV-07-C	Extended Advertising, Secondary Channel, Latest Transmission to Advertiser – LE 2M PHY
LL/TIM/ADV/BV-08-C	Extended Advertising, Secondary Channel, Latest Transmission to Advertiser – LE Coded PHY
LL/TIM/MAS/BV-01-C	MASTER - Earliest Transmissions to Master
LL/TIM/MAS/BV-02-C	MASTER - Master Retransmission
LL/TIM/MAS/BV-03-C	Initiate Sleep Clock Accuracy Update

LL/TIM/MAS/BV-04-C	Response to Sleep Clock Accuracy Update
LL/TIM/MAS/BV-05-C	Response without Reducing the Sleep Clock Accuracy
LL/TIM/MAS/BV-06-C	Extended Advertising, Secondary Channel, Latest Transmission to Advertiser – LE 2M PHY
LL/TIM/MAS/BV-07-C	Extended Advertising, Secondary Channel, Latest Transmission to Advertiser – LE Coded PHY
LL/TIM/SCN/BV-01-C	Extended Scanning, Secondary Channel, Earliest Transmission to Scanner – LE 1M PHY, Core 5.0
LL/TIM/SCN/BV-02-C	Extended Scanning, Secondary Channel, Earliest Transmission to Scanner, LE Coded PHY, Core 5.0
LL/TIM/SCN/BV-03-C	Extended Scanning, Secondary Channel, Latest Transmission to Scanner, LE Coded PHY, Core 5.0
LL/TIM/SCN/BV-04-C	Extended Scanning, Secondary Channel, Earliest Transmission to Scanner – LE 2M PHY, Core 5.0
LL/TIM/SCN/BV-05-C	Extended Scanning, Secondary Channel, Earliest Transmission to Scanner – LE 1M PHY, Core 5.1
LL/TIM/SCN/BV-06-C	Extended Scanning, Secondary Channel, Earliest Transmission to Scanner – LE 2M PHY, Core 5.1
LL/TIM/SCN/BV-07-C	Extended Scanning, Secondary Channel, Earliest Transmission to Scanner, LE Coded PHY, Core 5.1
LL/TIM/SCN/BV-08-C	Extended Scanning, Secondary Channel, Latest Transmission to Scanner, LE Coded PHY, Core 5.1
LL/TIM/SLA/BV-01-C	Test that a slave IUT on accepting a parameter update from the master adopts a new anchor point when starting to use the new parameters
LL/TIM/SLA/BV-02-C	Test that the slave IUT is able to establish and maintain a connection with a master that uses the earliest possible timing for the first transmission
LL/TIM/SLA/BV-03-C	Test that the slave IUT is able to establish a connection with a master that uses the latest possible timing for the first transmission
LL/TIM/SLA/BV-04-C	SLAVE - Packets To Another Slave
LL/TIM/SLA/BV-05-C	SLAVE - Packets To Another Slave
LL/TIM/SLA/BV-06-C	Earliest Transmission to Slave
LL/TIM/SLA/BV-07-C	Latest Transmission to Slave
LL/TIM/SLA/BV-08-C	Initiate Sleep Clock Accuracy Update
LL/TIM/SLA/BV-09-C	Response to Sleep Clock Accuracy Update
LL/TIM/SLA/BV-10-C	Response without Reducing the Sleep Clock Accuracy

*See 2.1.4 Manual Attenuation of Some PCL Tests

1 These tests are available for early access and have not been approved by the SIG.

4.1.4 Importing Tests

If the SIG's Bluetooth Launch Studio (BLS) was used to generate the BLS document with a list of tests, the BLS document can be imported into Harmony to automatically select the tests.

To import the tests:

1. Click "Import/Export"

2. Click "Import test selection from Bluetooth Launch Studio document…"
3. Point to the location of the file
4. Open the file. (Figure 4.2)
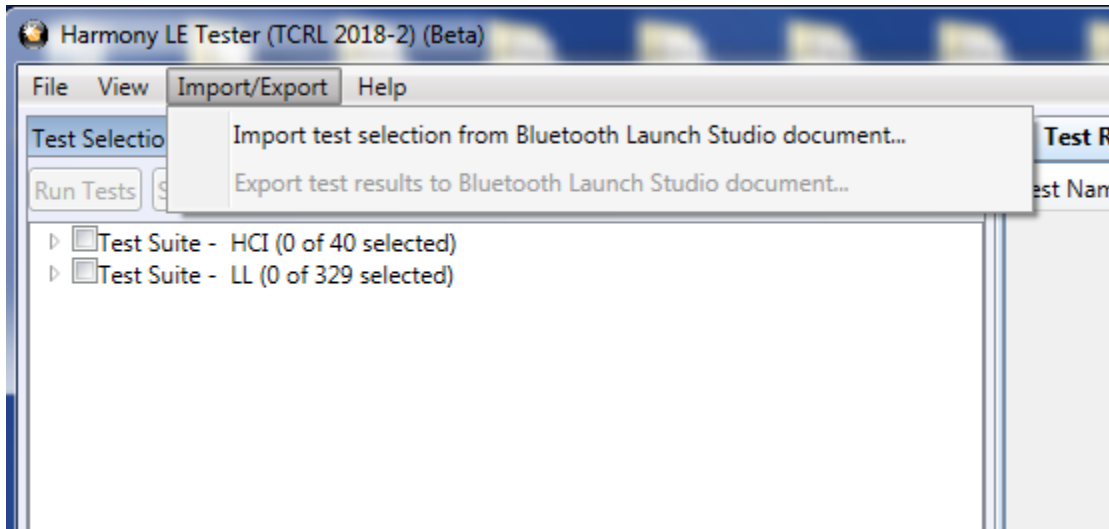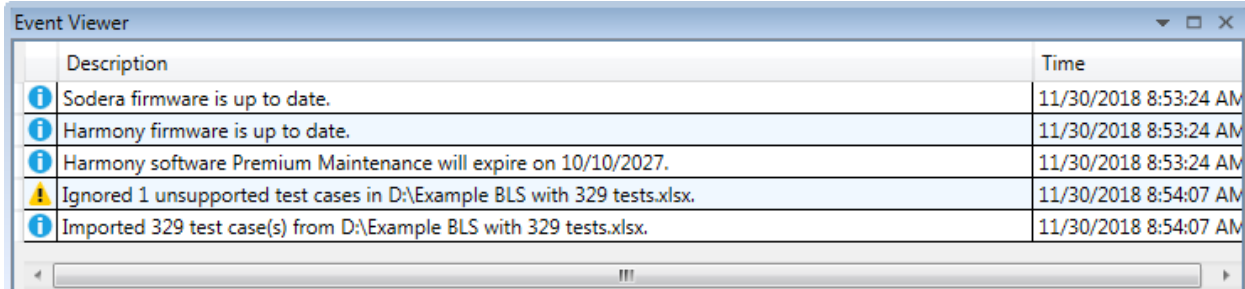
Figure 4.2 – Import Bluetooth Launch Studio Document

The Event Viewer will show how many tests were imported and if there were any problems with some of the tests in the list (for example having a test in the document that had been deleted in the TCRL and no longer supported). (Figure 4.3)

Figure 4.3 – Event Viewer

4.1.5 Alternative Ways to Select or Deselect Test Cases

The Search feature can be used to select or deselect individual or groups of tests depending on what is entered in the Search box. For example, entering PCL into the Search box, right clicking the Search icon

, and "Select Test Cases" will select the 1 PCL HCI test case and 51 Link Layer PCL test cases. If LL/PCL had been put into the Search box then only the 51 Link Layer PCL test cases would be selected. One can select just one test case if enough information is put into the Search box to make it unique to one test. Tests can be deselected in groups as well by choosing the "Deselect Test Cases" option.
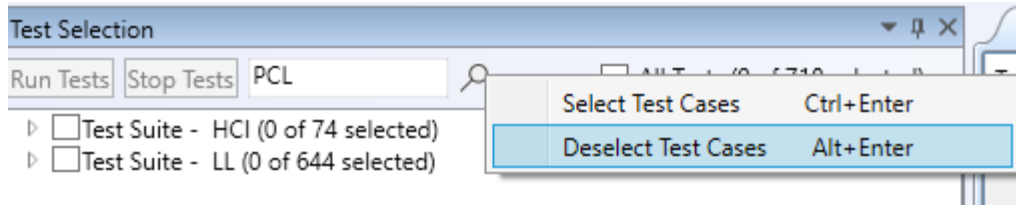
Figure 4.4 – Select or Deselect Tests from Search Criteria

The "Test Selection Manager" can allow tests to be selected by Feature type. The "Test Selection Manager" can be found under "Options". To select tests based on a feature select one or more features under "Feature Group" and click the `-->` button. The Feature name along with the number of tests cases in each feature will be displayed in the "Test Groupings" section. There will be a count of the total number of unique tests at the bottom (this may be different then the total number of tests because some tests fall under multiple features). If the selection is correct then click the Ok button and those tests will be selected. For example, to select all of the LE 2M PHY tests select "LE 2M PHY", click the `-->` button, then click the OK button.
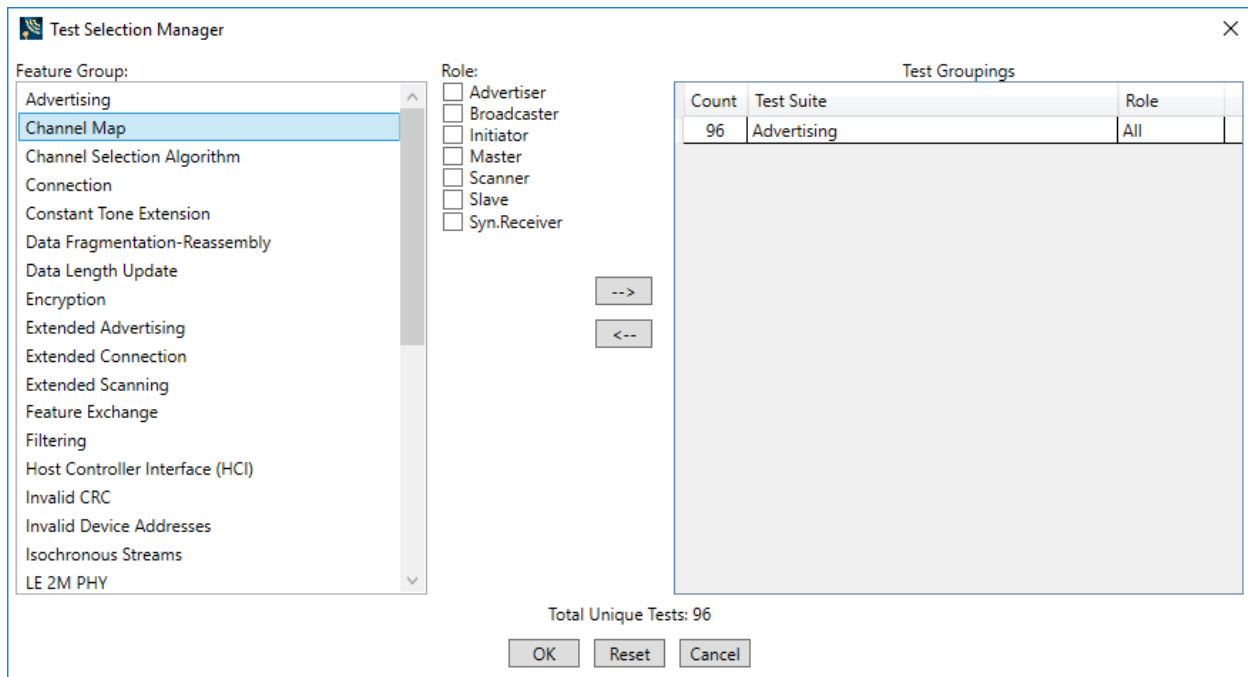
Figure 4.5 – Test Selection Manager

One can also select all the failed test cases from a specific test run or select all of the test cases from a specific test run by doing the following:

1. Open a project and select the "Run Explorer" tab.
2. Right click the test run of interest and click either "Select all test cases from this run…" or "Select failed test cases from this run…"
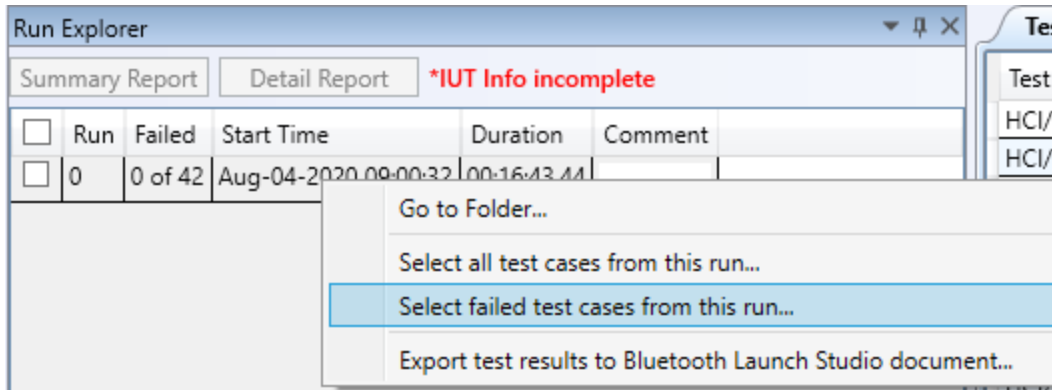
Figure 4.5 – Select All or Select Failed from a Test Run

4.2 Initiating Tests

4.2.1 Run Tests

1. Selecting any number of tests makes the "Run Tests" button become available to click.
2. Makes sure all connected equipment is powered and running.
3. Once the desired tests are selected, click the "Run Tests" button to initiate. (Figure 4.6)
4. Clicking the "Run Tests" button automatically saves the project.
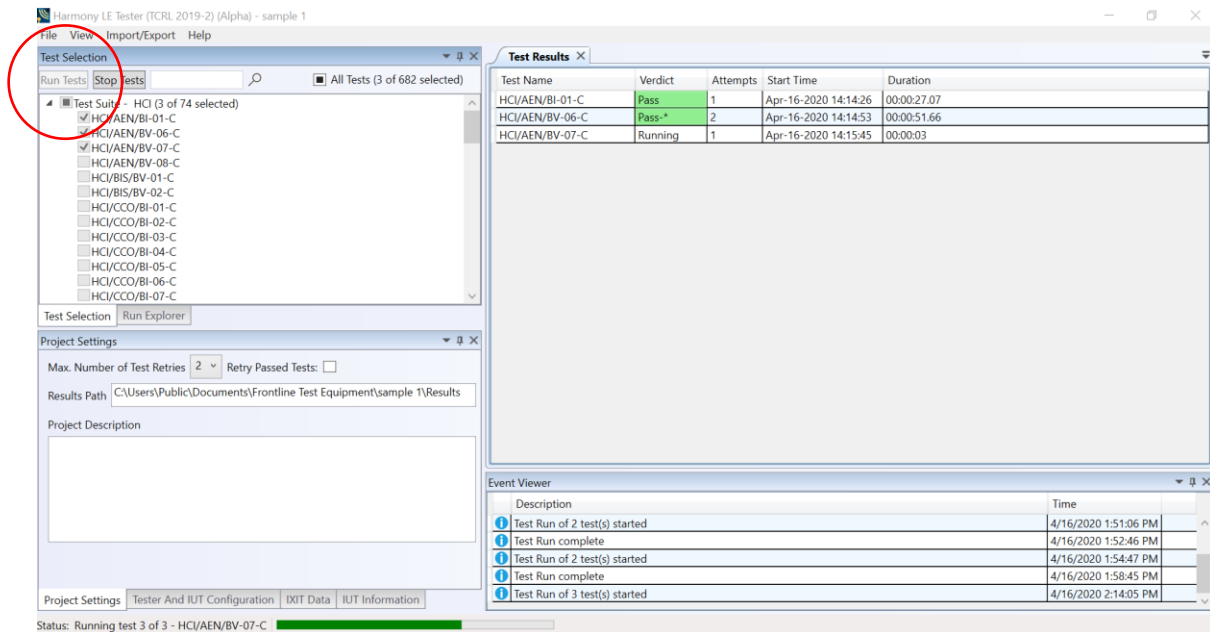
Figure 4.6 – Run Tests
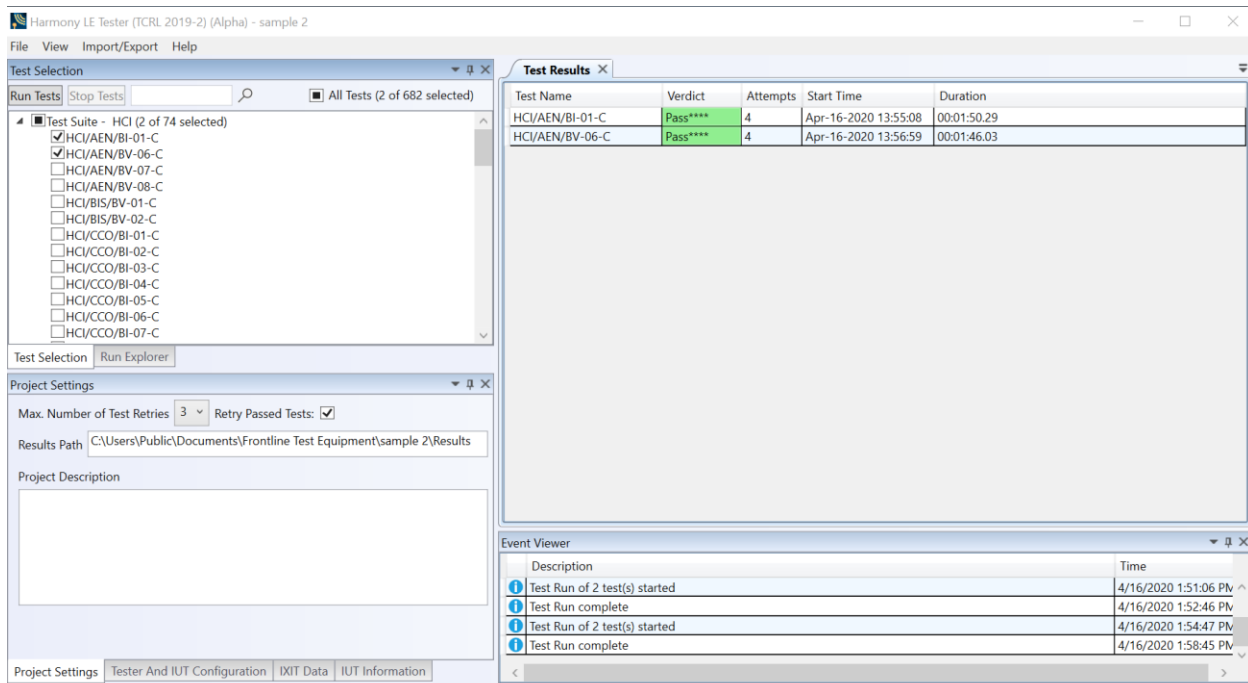
5. The Harmony software will run each selected test to completion before moving to the next selected test. If a test is successful it will have one of these three possible verdicts: "Pass", "Inconclusive", or "Manual". If a test fails that test will get the Verdict of "Fail";

the test will then be retried until the specified number of test retries has been achieved, at which time a final verdict of "Fail" will be issued. If a test passes on one of the retries the final verdict will be "Pass" followed by dashes and an asterisk. The number of dashes will represent the number of times the test failed and the asterisk will indicate that the test passed after at least one retry. The "Inconclusive" verdict can also have dashes and asterisks if the test failed on the first attempt.

6. The Status indicator at the bottom of the screen will indicate the progress of all selected tests. If you selected two tests, the Status indicator will go halfway to indicate the completion of the first test, then fill completely, indicating that both tests have been completed.
7. Testing stops when all tests have completed, or if the user clicks "Stop Tests."
8. If any selected test requires Sodera to complete, the Frontline software will automatically be launched.

4.2.2 Retry Passed Tests

The Harmony Tester under normal conditions will run a test for the set number of retries until a test passes. Once the test passes Harmony moves onto the next test. Sometimes a user may want to have a test or group of tests run multiple times even when the test(s) pass on each attempt. The "Retry Passed Tests" option will allow for multiple runs of the same test(s). To enable this feature, go to the "Project Settings" tab and select the "Retry Passed Tests" checkbox. Then select the number of retries in the "Max. Number of Test Retries" dropdown box. When the test(s) are run they will run one more than the Max. Number of Test Retries. When a particular test is finished if the test completely passed the verdict will be "Pass" followed by a number of asterisks representing the number of times the test passed. If a test failed during any of the attempts a dash will represent a failed attempt. For example, if a test is run four times and the test failed on the second attempt the verdict would be: Pass *-**

Figure 4.7 – Retry Passed Tests

4.2.3 Running Harmony Projects Unattended

This feature allows Harmony Tester to be run from the command line with a command line parameter specifying a Harmony project file to be opened and run. After all the tests have run, Harmony Tester software closes and a final result is returned to the console.

1. To use this feature, preliminary setup steps must be completed in the primary Harmony Windows application (HarmonyLeTester.exe):
    a. The project file must be completely set up (see section 3.1.1).
    b. The appropriate test cases must be selected and then saved (see sections 4.1.1 for HCI tests and 4.1.2 for Link Layer tests).
    c. The Harmony Tester and Sodera firmware must be up to date and the licenses for Harmony Tester and Sodera cannot be expired (see Chapter 1 for information about hardware and software updates)
    d. The IUT and testing hardware must be properly configured (see section 3.1.2).
2. Save the project file and close the Harmony Tester software (HarmonyLeTester.exe).
3. Open the command prompt and change the directory to where the Harmony Tester executables are installed. (Figure 4.6)
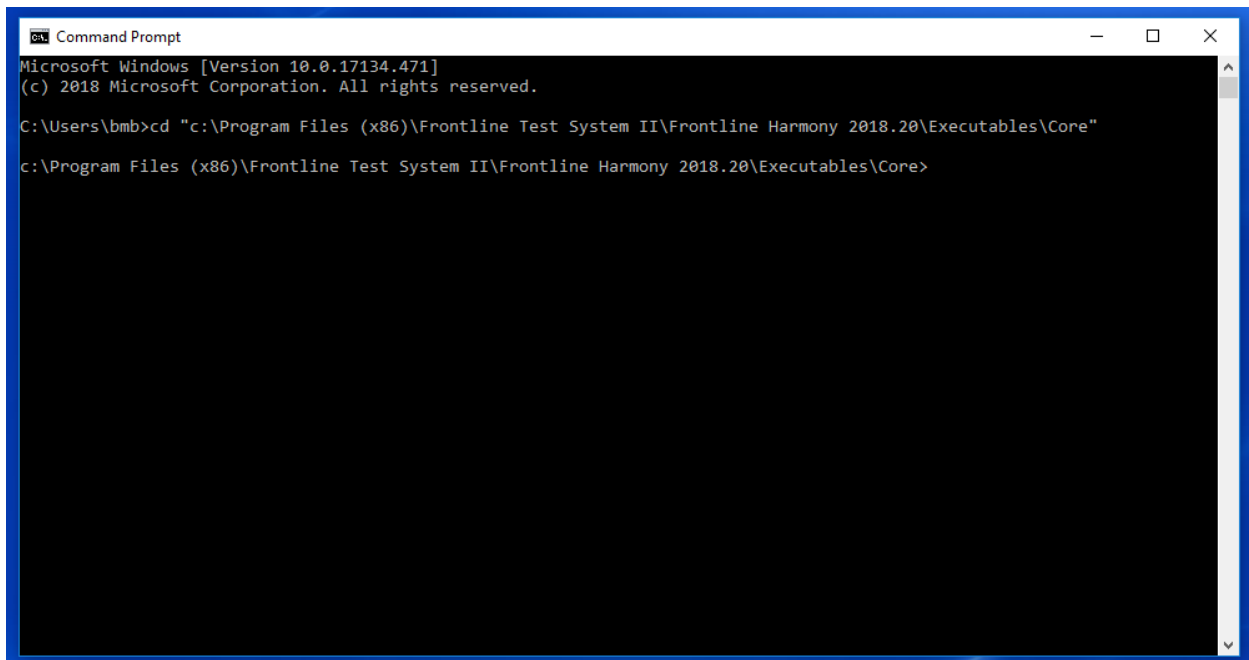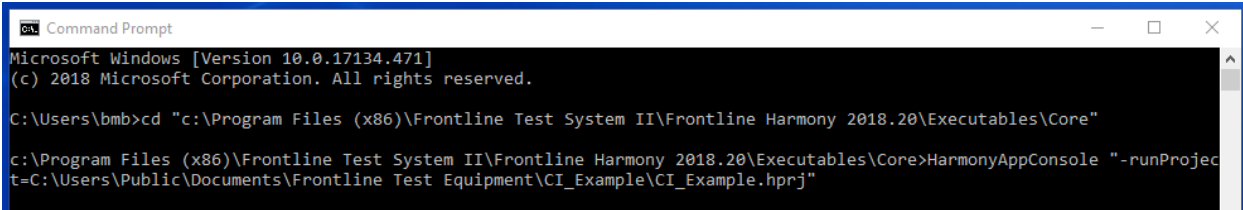
Figure 4.6 – Locating Executables Directory

4. Run the HarmonyAppConsole.exe with the command line parameter "–runProject=<path_and_filename.hprj>". **Note:** the executable for running from command prompt is **HarmonyAppConsole.exe**, NOT HarmonyLeTester.exe.
    Example (Figure 4.6): HarmonyAppConsole "-runProject=C:\Users\Public\Documents\Frontline

Test Equipment\CI_Example\CI_Example.hprj"

Figure 4.7 – Running the Executable

5. The HarmonyLeTester.exe should start, the CI_Example.hprj project opened, and the selected Test Cases run.
6. After the Test Cases are all run and the HarmonyLeTester windows application closes, a summary of the results will be written to the console output. (Figure 4.7)

Figure 4.7 – Summary of Results

7. If the Harmony project file specified is an invalid file OR is not completely setup, then the ExitCode will be 1.
8. If all the Test Case verdicts are either "Pass" or "Inconclusive", then the Overall Results will be "Pass" and the ExitCode will be 0.
9. If any Test Case verdict is either "Fail" or "Not_Applicable", then the Overall Results will be "Fail" and the ExitCode will be 1.

Chapter 5. Test Results
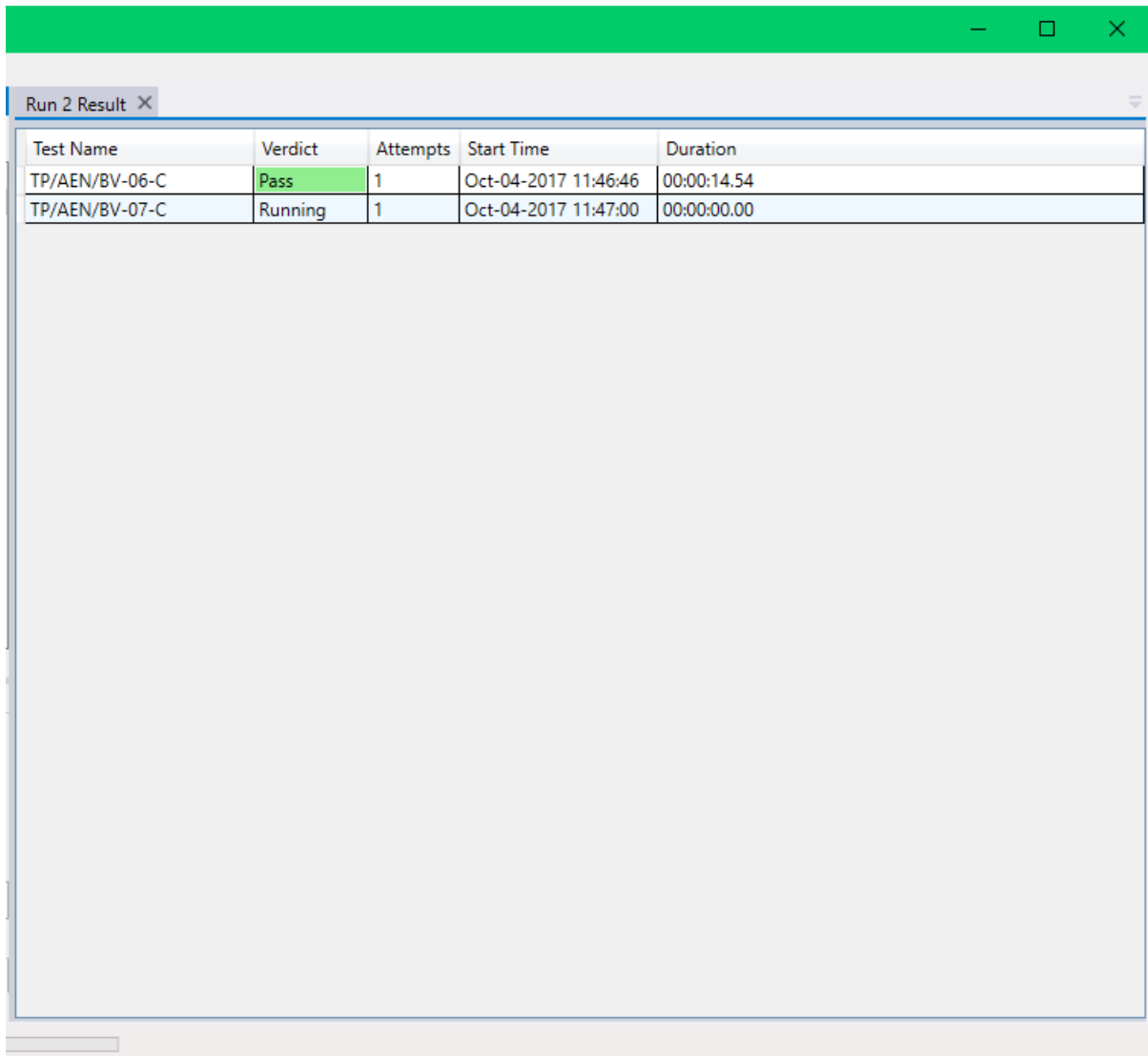
In this chapter, we describe on-screen test results, review previously run tests, produce reports for submission to the Bluetooth SIG, and describe how to access results files.

5.1 On-Screen Test Results

5.1.1 Results Pane

The Results pane can give you a very quick visual sense of the status of your tests.

1. The battery of selected tests will be displayed in the Results pane, with the tab indicating the number of selected tests. (Figure 5.1)
2. The Test Results pane displays the test name, the verdict/status of the test, the number of attempts made, the start time of the test, and the duration of the test.

Figure 5.1 – Test Results Pane

3. Tests that are still running will indicate that status in the "Verdict" column. Tests that have completed will be indicated by either a "Pass", "Fail", "Inconclusive", "N/A", or "Manual" in the "Verdict" column. (Figure 5.2) The verdict of "Pass" or "Inconclusive" may be followed by a series of dashes and an asterisks if the test failed on the first attempt.
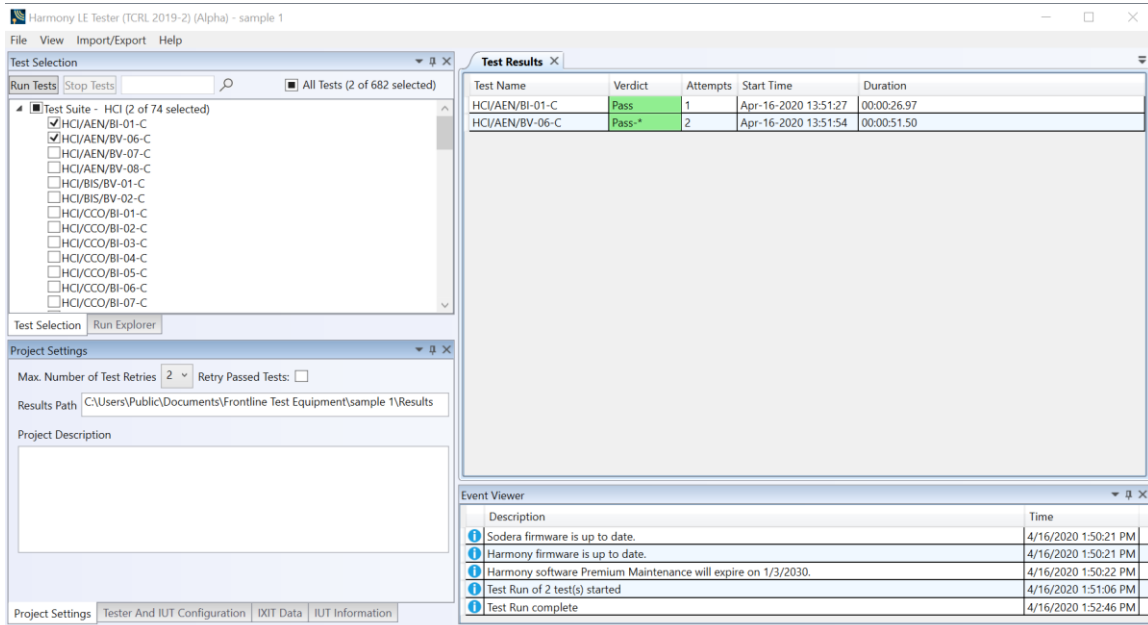

Figure 5.2 – Completed Tests

5.1.2 Review Previously Run Tests

Previously run tests can be called up and reviewed at any time.

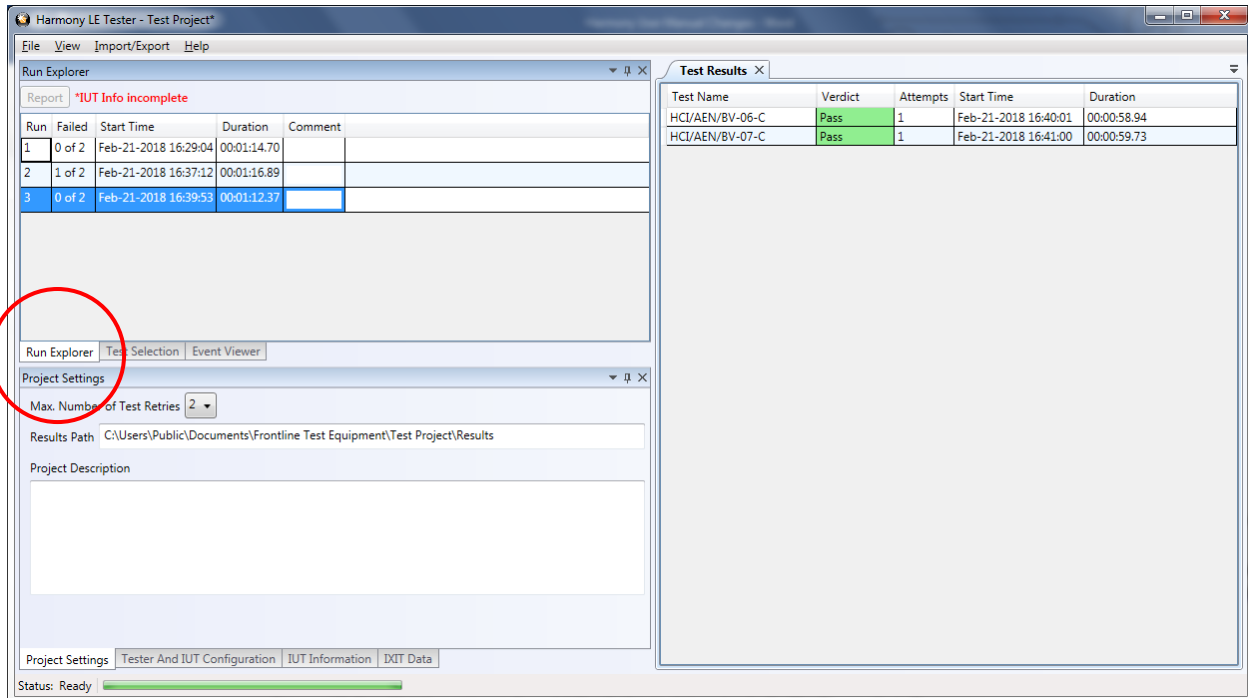1. Click the "Run Explorer" tab to access previously completed tests. (Figure 5.3)

Figure 5.3 – Run Explorer

2. Click to select a specific test run for review. That test's results will appear in the "Test Results" pane.

5.2 Produce Test Result Reports

5.2.1 Reports

You can generate results reports right from the Run Explorer screen.

1. To generate a pdf report of the results of any completed test run, go to the Run Explorer, select the desired report for printing, and click the "Detail Report" button.

2. Upon clicking the "Detail Report" button, a test report pdf file is generated that includes all the test results, meta information and fields required by the Bluetooth SIG to for validation. This file is acceptable for submission to the Bluetooth SIG of any test case for which Harmony has been recognized as a Validated Test System.

    a. Declaration of Results – this is a statement to be signed by the tester certifying that the results are accurate and have been checked for integrity.

    b. Test Engineer Information – this section reports the test engineer and the test engineer's contact information

    c. Customer Details – this section reports the customer and the customer's contact information

    d. Manufacturer Details – this section reports the manufacturer and the manufacturer's contact information

    e. Product Details – This section provides details about the product including model and serial information, hardware and software versions, product name, and other identifiers

f. IXIT – this section reports the information provided by the user in the "IXIT Data" table

g. Harmony Version Information – this section reports the version details about the Harmony hardware and software

h. Test Results Summary – this section provides a very high level overview of the tests run, the "Pass" or "Fail" outcomes of those tests, and a brief statistical analysis of the total testing run

i. Test Summary – a detailed testing summary will be reported for each test run, and will show each step taken by the test in order to complete. (Figure 5.4)

j. Result Signature - a cryptographically signed value that can prove the authenticity of this test result

k. If the test selection was done by importing a Bluetooth Launch Studio (BLS) document once the tests have been run the results can be exported back to the BLS document. To export the test results click "Import/Export", click "Export test results to Bluetooth Launch Studio document…", select the file, and click the "Export" button. (Figure 5.5.)

TP/AEN/BV-06

Start Time	Duration	Attempts	Verdict
October 04, 2017 11:46 AM	00:00:06.1570000	1	Pass

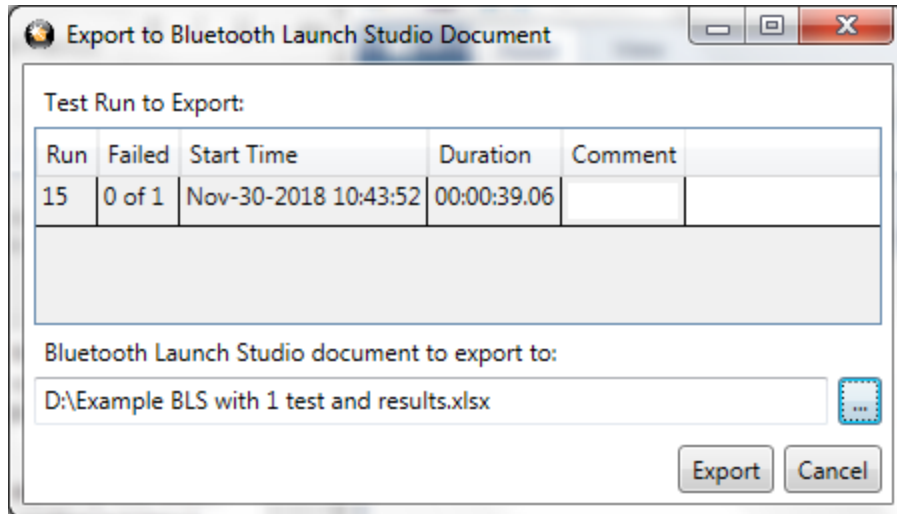|	
Summary	Wait for devices to become available Configure devices Reset devices IUT does not support device address assignment Device addresses IUT = 0xcf045b747e45 TESTER[0] = 0x00005f010101 Set event masks IUT Version: Event_Code: 0xe (14) HCI_Revision: 0x2200 (8704) HCI_Version: 0x9 (9) LMP_Subversion: 0x2200 (8704) LMP_Version: 0x9 (9) Manufacturer_Name: 0xff (255) Parameter_Length: 0xc (12) IUT Features: Event_Code: 0xe (14) LE_Features: 0x179ff (96767) Parameter_Length: 0xc (12) Whitelist devices Adding bd_addr=0x00005f010101 to whitelist on device bd_addr=0xcf045b747e45 Adding bd_addr=0xcf045b747e45 to whitelist on device bd_addr=0x00005f010101 PASS -- actual 0 (LeReadBufSize.Status) is expected equal to 0 (SUCCESS) PASS -- actual 256 (IUT ACL data packet length) is expected greater than or equal to 27 PASS -- actual 8 (total num of ACL data packets) is expected not equal to 0 Include P-256 Public Key Complete Event in event mask PASS -- actual 0 (SetEventMask.Status) is expected equal to 0 (SUCCESS) PASS -- actual 0 (LeSetEventMask.Status) is expected equal to 0 (SUCCESS) Generate first P-256 public/private key pair PASS -- actual 0 (LeReadLocalP256PubKey.Status) is expected equal to 0 (SUCCESS) Wait for IUT to send a SUBEVT_LE_READ_LOCAL_P256_PUB_KEY_CMPL_EVT PASS -- actual 0 (SUBEVT_LE_READ_LOCAL_P256_PUB_KEY_CMPL_EVT.Status) is expected equal to 0 (SUCCESS) Generated key 8573a8d7a0cad60ff0188cc043699ae18d5ef3fbd2443279efb8f77369c75e0fc73f5cce442ae6aacb7ea5 6b32eaac84c4be7d560042bc4ed20b3fe9e643a817 Generate second P-256 public/private key pair PASS -- actual 0 (LeReadLocalP256PubKey.Status) is expected equal to 0 (SUCCESS) Wait for IUT to send a SUBEVT_LE_READ_LOCAL_P256_PUB_KEY_CMPL_EVT PASS -- actual 0 (SUBEVT_LE_READ_LOCAL_P256_PUB_KEY_CMPL_EVT.Status) is expected equal to 0 (SUCCESS) Generated key d535f22a6aba141b05dfc2b902b1243031368d383003a13125a5c78218480ffa9f83b7ebe8f75089f9f896 e2045be029c303c6329945b1924feaf76a307376e1 Verify that keys are not the same PASS -- actual \x85s\xA8\xD7\xA0\xCA\xD6\x0F\xF0\x18\x8C\xC0Ci\x9A\xE1\x8D^\xF3\xFB\xD2D2y\xEF\xB8\ xF7si\xC7^\x0F\xC7?\\xCED*\xE6\xAA\xCB~\xA5k2\xEA\xAC\x84\xC4\xBE}V\x00B\xBCN\xD2\x0B?\xE9\xE6C\xA8\ x17 (key 1) is expected not equal to \xD55\xF2*j\xBA\x14\x1B\x05\xDF\xC2\xB9\x02\xB1$016\x8D80\x03\x A11%\xA5\xC7\x82\x18H\x0F\xFA\x9F\x83\xB7\xEB\xE8\xF7P\x89\xF9\xF8\x96\xE2\x04[\xE0)\xC3\x03\xC62\x9 9E\xB1\x92O\xEA\xF7j0sv\xE1 (key 2)
Result Signature	b19966a4cf287dbb6b176535107ed59e5b917de7b5f4bcd838c14cc1d96f95c2

Figure 5.4 – Testing Summary

Figure 5.5 – Export to Bluetooth Launch Studio Document

5.2.2 Summary Report

A Summary Report can be generated using one or more test runs. The report will be in Excel format and show the total number of failures per Test Run column as well as Attempts Failure Ratio for each test case over all of the test runs. To generate a Summary Report go to the "Run Explorer" tab, select the checkbox for each of the Test Runs to include, and click the "Summary Report" button.
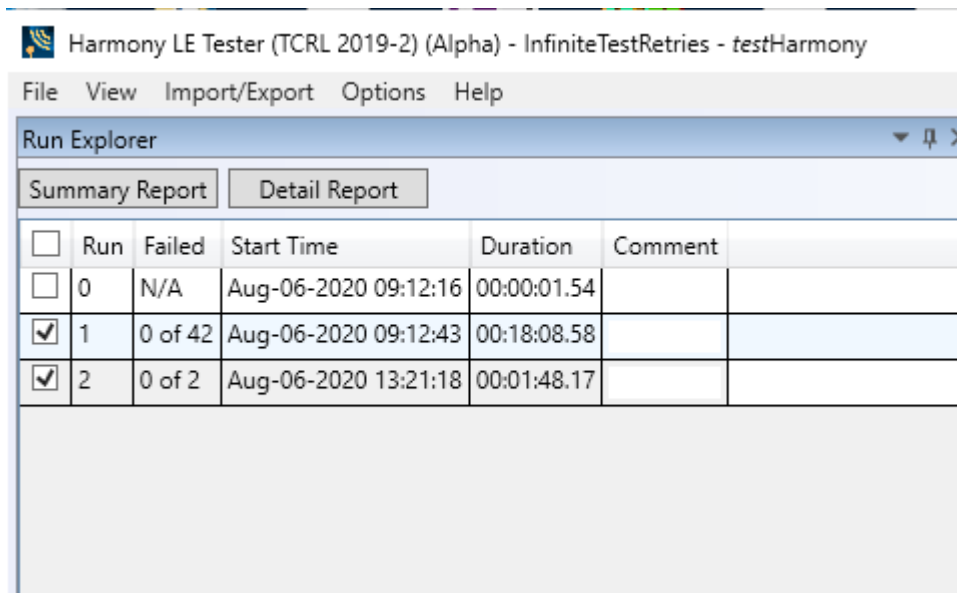

Figure 5.6 – Summary Report

5.3 Results Files

This is where to go to find more information on test case failures, as well as HCI and RF captures that can be used as evidence on test cases for which Harmony is not a Validated Test System.

5.3.1 Location

Your test results data files are stored in a "Results" folder in the location you specified (see Section 3.1.1) when you initially saved the project. The "Results" folder is automatically created when you save the project, and the log and capture files created by the testing process are automatically saved there. (Figure 5.5)

Shortcuts are also available to access Test Results and Test Runs:

Shortcut to Specific Test Results

1. Select the Test Results tab.
2. Right click the particular test.
3. Click the "Go to Folder…"

Or

To Open a Specific File

1. Select the Test Results tab.
2. Right click the particular test.
3. Click "Test Cases Files".
4. Click "Attempt_x" where x is the attempt number.
5. Click the specific file to open.

Shortcut to the Folder the Test Runs

1. Select the Run Explorer tab.
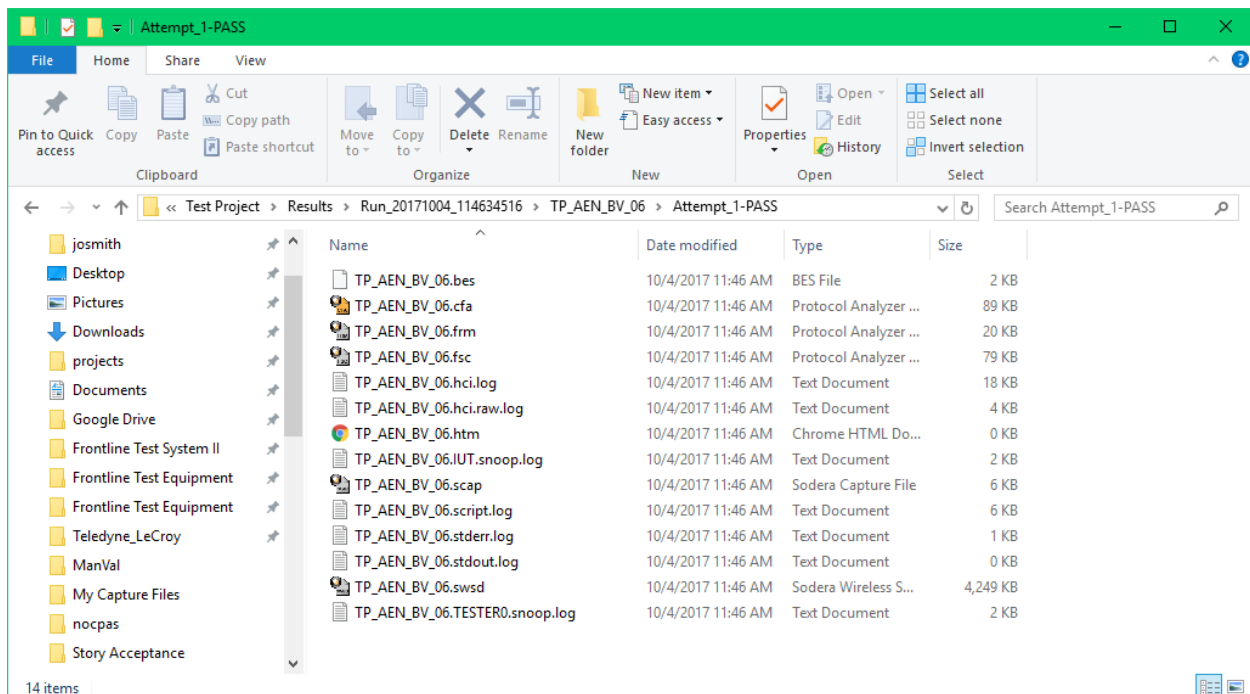2. Right click the set of test runs of interest.
3. Click the "Go to Folder…"

Figure 5.6 – Results Files

5.3.2 Log/Capture Files

1. The log files stored in the "Results" folder contain the detail of each test, and are therefore critical files. They are accessed by the reporting function of the Harmony software. Important files include:
   a. *.script.log **–** records the detail of the test case
   b. *.IUT.snoop.log - btsnoop capture of the HCI traffic to & from the IUT
   c. *.cfa – Sodera capture file
   d. *.scap, *.bes, *.frm, *.fsc, *.swsd, *.htm - Sodera capture-related files

Chapter 6. General Information

In this chapter we advise how to resolve issues uncovered by the testing process.

6.1 More Help

6.1.1 Frontline Software

1. Frontline software was designed to help you find and resolve Bluetooth-related issues. The *.cfa and *.IUT.snoop.log files created by the testing process can be loaded into the Frontline Software, where you can view the Bluetooth timeline, check for 802.11 coexistence interference, and view the decode level of any error uncovered by the process.

2. To open a capture file, right click the test verdict in the "Test Results" tab for the particular test to open. Use "Test Case Files" to navigate to the particular "Attempt" folder (if there is more than one attempt) and left click the file with the .cfa extension.

6.1.2 User Assistance

For more information about how to best use the Frontline software or to report a problem, please contact us via the web at http://fte.com/company/contactus.aspx or email tech support at frontline_techsupport@teledyne.com.

Chapter 7. *test*Harmony

7.1 Available Tests

In *test*Harmony the number and types of tests available are based on which features were bought with the *test*Harmony license. For example, if a testHarmony license only has HCI and 2M LE PHY then only HCI and 2M LE PHY test cases will be available in *test*Harmony mode. In addition, the "Test Selection Manager" will only show the available features. If the license has both *conformance*Harmony and *test*Harmony then the user will be able to switch between the modes and if the user is in *conformance*Harmony mode all of features and tests will be available.

7.2 Running With or Without the Sodera or X240

In *test*Harmony one can run the tests normally with the Sodera or X240 connected. There is also an option to run tests without having the Sodera or X240 connected.
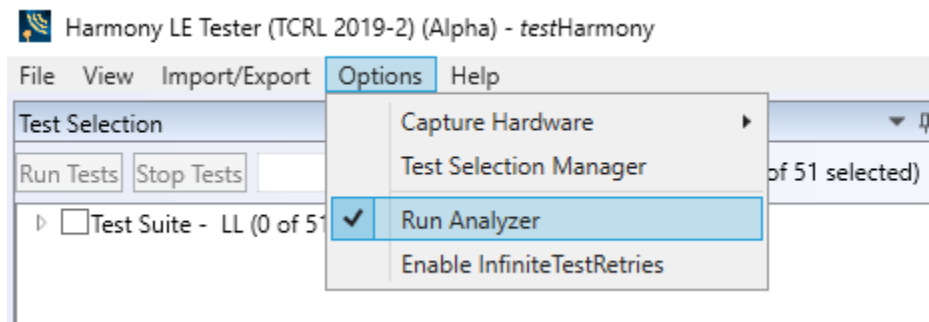

Figure 7.1 – Test Harmony Options

If the "Run Analyzer" option is enabled then the Sodera or X240 have to be connected and the tests will run just like they do in conformanceHarmony mode. If "Run Analyzer" is disabled then the Sodera or X240 do not have to be connected and even if they are connected they will not be used. If "Run Analyzer" is disabled any test that requires a Sodera or X240 and passes will have a Final Verdict of Manual.

7.3 InfiniteTestRetries

InfininiteTestRetries allows one to run a test repeatedly and after the test has been stopped the Pass/Faillure count (* is a pass and – is failure) will be displayed in the Verdict column for the particular test.
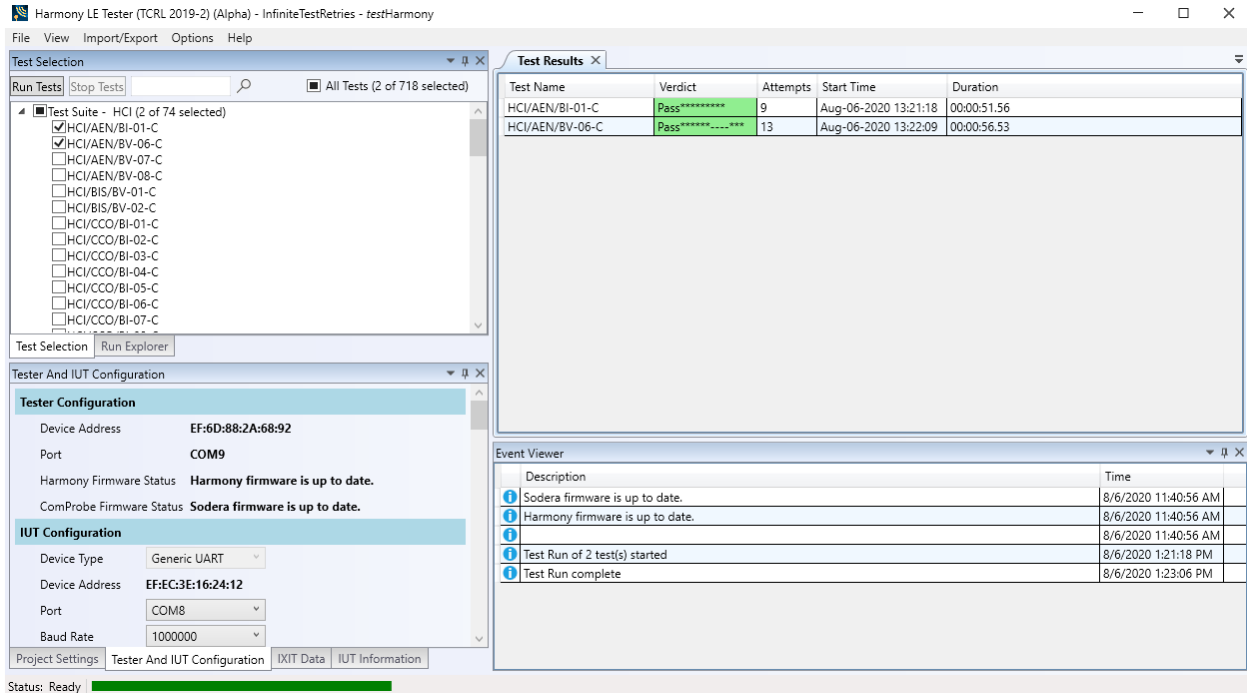
Figure 7.2 – InfiniteTestRetries Results

To stop an Infinite test run disable the "Enable InfiniteTestRetries" and the test will end after the currently run test stops. If multiple tests are to be run infinitely once the first test has finished and the second test starts go back to the "Option" menu and enable "Enable InfiniteTestRetries" so the second test will repeatedly be tested.
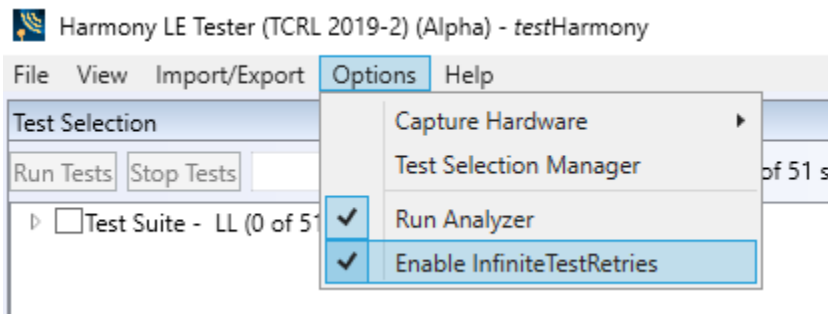

Figure 7.3 – Enable InfiniteTestRetries

7.4 Report Generated in *test*Harmony

A Detailed Report can be generated in testHarmony mode. However, the report will not be a report that can be submitted to the SIG. A report generated in testHarmony mode will not include the Result Declaration, the Test Engineering Info, Product Info, Test Script Logs, or the Conformance Signature. The report will have a watermark stating: "Invalid for Conformance".

Chapter 8. Regulatory

8.1 Certifications

All relevant certificates of conformance can be found online at http://www.fte.com/conformance.

8.1.1 FCC - Federal Communications Commission

1. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
2. Changes or modifications not approved by the responsible party could void the user's authority to operate the equipment.

8.1.2 RED - Radio Emissions Directive

1. This equipment operates in the frequencies 2400 mHz – 2483.5 mHz.
2. The maximum radio-frequency power transmitted by this equipment in the above frequency bands is +4 dBm.

8.1.3 ISED - Innovation, Science and Economic Development (RSS Radio Standards Specification)

This device complies with Industry Canada's license-exempt RSSs.

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux RSS exempts de licence d'Industrie Canada.

1. Cet appareil ne doit pas causer d'interférences; et
2. Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.