



FRVS Quick Start Guide

If you experience problems or need more information, please see the *FRVS User Manual* or the Teledyne LeCroy web site:
<https://fte.com/products/frvs.aspx>

FRVS™ Bluetooth® Test System RF Qualification Test System



1

Introduction

The FRVS Bluetooth Test System is recognized by the Bluetooth SIG as a validated test system for qualification testing of products to the Bluetooth BR/EDR and Low Energy RF test specifications

The FRVS is a highly portable and flexible qualification testing solution that, due to its unique parallel architecture, can execute testing much faster than traditional RF test systems.

- ◆ Recognized by Bluetooth SIG as a validated test system for Bluetooth BR/EDR RF and LE RFPHY Test Specifications
- ◆ Fully automated test bench solution with unrivalled speed of test
- ◆ Test scripts included to execute all test cases in Bluetooth BR/EDR and Bluetooth® Low Energy Bluetooth SIG test specifications.
- ◆ Detailed test reports created automatically for Bluetooth SIG submission

2

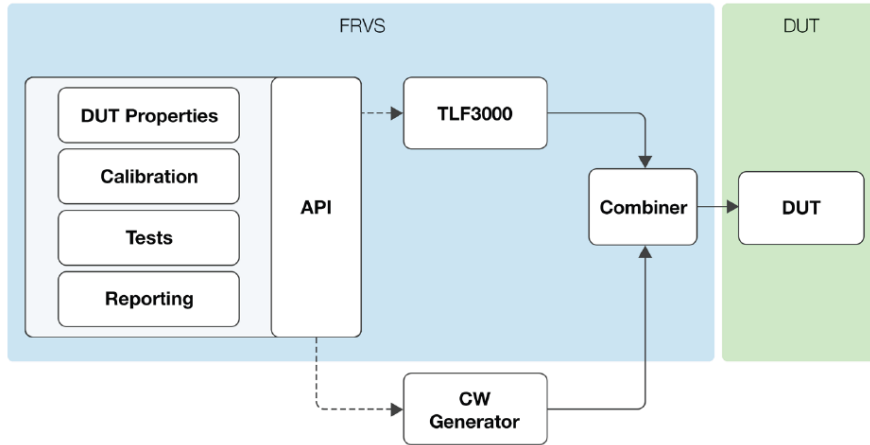
System

Frontline FRVS is used for qualification testing of Bluetooth BR/EDR RF and LE RFPHY tests.

Bluetooth Specifications—Uses the latest Bluetooth System Core, RF.TS and RFPHY.TS specifications.

TLF3000—TLF3000 RF Tester which can test all the test cases up to 6GHz.

CW Generator—To perform blocking performance test cases which go up to 12.75GHz, an external CW generator is used (not included with FRVS).



System Layout

3

Software Overview

Menu—The Menu contains options for file locations, saving the DUT configuration, selecting the Test Suite, and accessing Tools.

Configuration—Configures the TLF3000, signal generator and DUT parameters.

Test List—A list of possible tests based on DUT-supported features. Tests can be selected and run, and the verdicts and test duration are displayed.

Logging—Allows viewing of logs, a Result Tree to navigate through the results, and provides a detailed view of each test in the Result View.

4

Test Suite Configuration

NOTE: A valid license must be available to run tests. This can be verified from **Tools → Check License**

To configure the FRVS, do the following:

1. Insert the USB dongle with the License Key into the PC USB port.
2. Power on the device to be configured.
3. Follow the system prompts to install the configuration software.

Once the setup is complete, the Main Menu becomes available.

4. You will need to select a Test Suite:

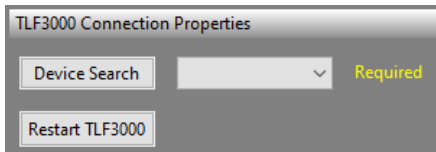
From the Main Menu, click **Mode → Bluetooth** (for BR/EDR) or **Mode → Bluetooth LE** (for low energy)

NOTE: Only one Test Suite may be selected at a time

5 Connect the TLF3000 and RF Combiner

NOTE: For ethernet, TLF3000 must be on same subnet

5. Connect the TLF3000 via USB or Ethernet
6. From Configuration Panel, select TLF3000 Connection Properties.

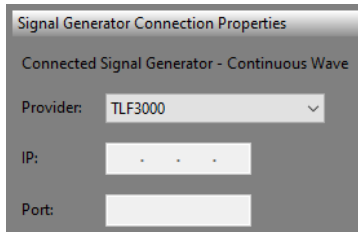


NOTE: Multiple TLF3000 devices may be available.

7. Select the device you want to connect from the drop-down list.
You can also click Device Search to locate the appropriate device.
8. Connect TLF 3000 Tx/Rx to the input of the RF Combiner. Connect the RF Combiner output to the DUT

6 Connect the CW Generator

NOTE: SGS100A (not included with FRVS) must be on same subnet



NOTE: RF combiner must be used

1. Connect the SGS100A via Ethernet
2. From Configuration Panel, select CW Generator Connection Properties.
3. Select the device you want to connect from the drop-down list.
4. Enter IP and port.
5. Connect CW Generator RF Out to RF Combiner.

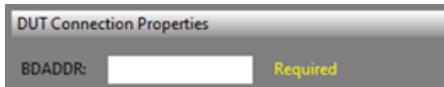
7 DUT Configuration – Bluetooth BR/EDR

To enable test selection, you must configure the DUT software connection and parameters from ICS/IXIT.

1. Connect the DUT over the RF interface via LMP commands.

NOTE: The DUT must be in Test Mode to accept these commands.

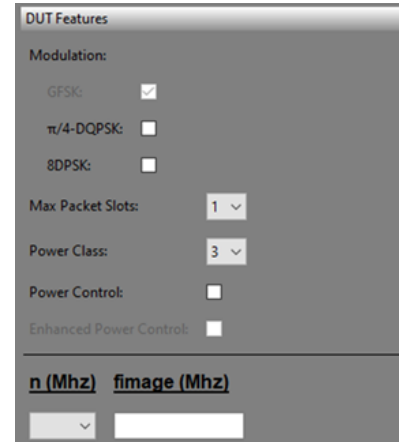
2. Input the BDADDR in the corresponding field for DUT Connection Properties:



The screenshot shows a dialog box titled "DUT Connection Properties". It contains a label "BDADDR:" followed by a text input field. To the right of the input field, the word "Required" is written in yellow text.

3. Specify the desired properties in the DUT Features section.

NOTE: DUT properties will be verified at the start of each test. If the properties are not compatible, the test will not run.



The screenshot shows a dialog box titled "DUT Features". It contains several configuration options:

- Modulation:**
 - GFSK:
 - $\pi/4$ -DQPSK:
 - 8DPSK:
- Max Packet Slots:** 1 (dropdown menu)
- Power Class:** 3 (dropdown menu)
- Power Control:**
- Enhanced Power Control:**

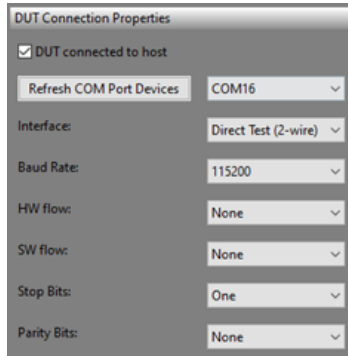
At the bottom, there are two fields: **n (Mhz)** and **fimage (Mhz)**. The **n (Mhz)** field has a dropdown menu showing a downward arrow. The **fimage (Mhz)** field is an empty text input box.

You must include modulation, $\pi/4$ -DQPSK for 2M and 8DPSK for 3M, maximum packet slots, and power control. The **n** value for intermodulation and image frequency must also be included.

8 DUT Configuration – Bluetooth LE

To enable test selection, you must configure the DUT software connection and parameters from ICS/IXIT.

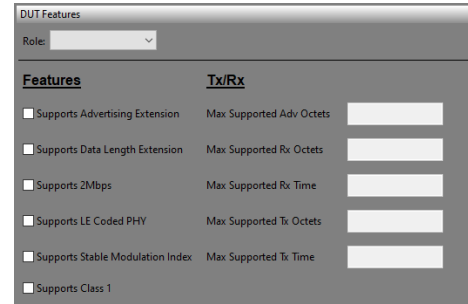
1. Enter the appropriate information into the corresponding fields in the DUT Connection Properties section.



The screenshot shows the 'DUT Connection Properties' dialog box. It has a title bar and a checkbox labeled 'DUT connected to host' which is checked. Below the checkbox is a 'Refresh COM Port Devices' button and a dropdown menu showing 'COM16'. The 'Interface:' dropdown is set to 'Direct Test (2-wire)'. The 'Baud Rate:' dropdown is set to '115200'. The 'HW flow:' dropdown is set to 'None'. The 'SW flow:' dropdown is set to 'None'. The 'Stop Bits:' dropdown is set to 'One'. The 'Parity Bits:' dropdown is set to 'None'.

NOTE: DUT properties will be verified at the start of each test. If the properties are not compatible, the test will not run.

2. In the DUT Features section, check the appropriate boxes for the necessary features and enter values into the corresponding fields.



The screenshot shows the 'DUT Features' dialog box. It has a title bar and a 'Role:' dropdown menu. Below the dropdown are two columns of features: 'Features' and 'Tx/Rx'. Each feature has a checkbox and a corresponding 'Max Supported' value with an input field.

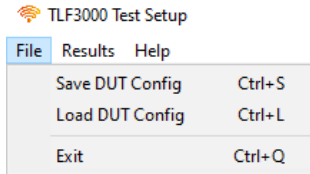
Features	Tx/Rx
<input type="checkbox"/> Supports Advertising Extension	Max Supported Adv Octets <input type="text"/>
<input type="checkbox"/> Supports Data Length Extension	Max Supported Rx Octets <input type="text"/>
<input type="checkbox"/> Supports 2Mbps	Max Supported Rx Time <input type="text"/>
<input type="checkbox"/> Supports LE Coded PHY	Max Supported Tx Octets <input type="text"/>
<input type="checkbox"/> Supports Stable Modulation Index	Max Supported Tx Time <input type="text"/>
<input type="checkbox"/> Supports Class 1	

9

Other Configurations

Saving a DUT Configuration

1. Click/Press **File** → **Save DUT Config**.
2. Follow the prompts to create a file containing the DUT connection and feature parameters you previously entered.



Loading a DUT Configuration

1. Click/Press **File** → **Load DUT Config**.
2. Follow the prompts to select the previously saved file. These will overwrite any values currently in the UI.

Record DUT Environment Parameters

You can Record DUT Environment Parameters, which will be output to PDF.

1. Enter the appropriate parameters in the Environment Properties section.

The screenshot shows the 'Environment Properties' dialog box with the following fields:

Temperature (°C)	20
Humidity (%)	40
Laboratory	TDY
Tester	TDY

Project Folder

1. The output folder for the report can be changed in the Properties Pane
2. Under Report Properties, click Select Folder



10 Compensation

NOTE: For valid results, the RF Combiner, connectors and cable losses must be compensated for.

1. FRVS uses a CSV file of [freq,loss] pairs to compensate for losses in the signal path.
2. The frequency is in MHz and the loss in dB
3. FRVS uses linear interpolation between the frequency points

Import a compensation file

1. In the properties pane, press/click **Select Calibration**.



11 Test Selection

NOTE: Correct technology and DUT parameters must be selected to ensure all relevant tests are available

1. Use the checkboxes to select tests required to be run
2. Individual tests may be selected or omitted to allow faster debug of failing tests
3. Test selection pane will gray out unselected tests

4. Transmitter tests are in red, receiver tests in blue

RF-PHY/TRM/BV-08-C	Ready		00:00:00.0	<input checked="" type="checkbox"/>
RF-PHY/TRM/BV-09-C	Ready		00:00:00.0	<input type="checkbox"/>
RF-PHY/TRM/BV-10-C	Ready		00:00:00.0	<input checked="" type="checkbox"/>
RF-PHY/TRM/BV-11-C	Ready		00:00:00.0	<input type="checkbox"/>
RF-PHY/TRM/BV-12-C	Ready		00:00:00.0	<input checked="" type="checkbox"/>
RF-PHY/TRM/BV-13-C	Ready		00:00:00.0	<input type="checkbox"/>
RF-PHY/TRM/BV-14-C	Ready		00:00:00.0	<input type="checkbox"/>
RF-PHY/RCV/BV-01-C	Ready		00:00:00.0	<input checked="" type="checkbox"/>

12 Logging & Result View

The logging pane shows progress messages and errors

The FRVS software allows the viewing of logs (“Output”, “Results Tree” and “Result” tabs)

1. Use the checkboxes to select tests required to be run

a Result Tree to navigate through the results and a Result view to enable a detailed view of each test

13 Testing

Running tests

1. Press/click **Start Testing** to start the tests
2. The current test has a status of Running and displays a progress bar with estimated remaining time



Abort testing

1. Press/click **Abort Testing** when tests are running to end
2. The test run will gracefully abort as soon as possible

3. When a test is completed, it will have a status of Complete, display the time taken to test and the Result
4. Possible results are Pass, Fail, Incomplete

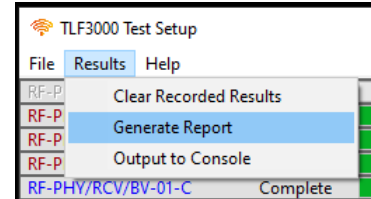
RF-PHY/TRM/BV-01-C	Complete	<div style="width: 100%; height: 10px; background-color: green;"></div>	00:00:00.8	Pass
RF-PHY/TRM/BV-03-C	Complete	<div style="width: 100%; height: 10px; background-color: green;"></div>	00:00:01.3	Pass

Clear results

1. Existing results can be removed
2. From the Main Menu, click **Results** → **Clear Recorded Results**

14 Reporting

1. Results can be exported into PDF format for breakdown of parameterized results and transmission
2. When testing is completed and tests are not running, a report can be generated
3. From the Main Menu, click **Results** → **Generate Report**



Results Summary

1. The report has a table summarizing all tests run and their respective verdicts



Results: Summary

RF-PHY/TRM/BV-01-C	PASS
RF-PHY/TRM/BV-03-C	PASS
RF-PHY/TRM/BV-05-C	PASS
RF-PHY/TRM/BV-06-C	PASS
RF-PHY/TRM/BV-08-C	PASS
RF-PHY/TRM/BV-09-C	NOT SUPPORTED
RF-PHY/TRM/BV-10-C	PASS
RF-PHY/TRM/BV-11-C	NOT SUPPORTED
RF-PHY/TRM/BV-12-C	PASS
RF-PHY/TRM/BV-13-C	PASS

Individual Test Results

1. Each test result shows the test number, title and time of test
2. Test results show the parametric results and limits for analysis



Results: 1 of 23

Start: 2020-12-07 09:49:34
End: 2020-12-07 09:49:34

PASS

RF-PHY/TRM/BV-01-C

Output power

Channel	Verdict	Pmin	Pmax	Pkmax
0	PASS	-13.89	-13.89	0.40
19	PASS	-14.19	-14.19	0.40
39	PASS	-13.88	-13.88	0.40

Teledyne LeCroy Customer Support

Online Download

Periodically check the Teledyne LeCroy Protocol Solutions web site for software updates and other support related to this product.

Web: : <http://www.fte.com/products/default.aspx>

Email: : Frontline_OnlineSales@Teledyne.com

Support: : Frontline_Techsupport@Teledyne.com

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Changes

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