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Bluetooth® Qualification Guidelines for RSL10-Based Products



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Introduction

In order to sell a Bluetooth-enabled device, the Bluetooth qualification and declaration process must be completed to demonstrate and declare that the product satisfies the requirements of the Bluetooth license agreements. The Bluetooth Compatibility Program complies with the requirements of Bluetooth license agreements and ensures a seamless user experience through the vast number of Bluetooth mobile devices that are available in the market.

This application note details the fundamental process of releasing a Bluetooth low energy technology product based on RSL10.

Once a product based on RSL10 is complete and ready for release to market, the product must be qualified.

On 1 February 2014, the Bluetooth Special Interest Group (SIG) introduced a new qualification and listing process and fee structure for all new product listings. Detailed information can be found on the Bluetooth SIG website.

Qualification Process

1. Become a Bluetooth SIG member and purchase a Declaration ID.
Detailed information can be found on the Bluetooth SIG website.
2. Prepare product information and submit to a Bluetooth Qualification Test Facility (BQTF). The BQTF will estimate the qualification test and procedure costs.
The following information will need to be prepared and submitted to a BQTF:

	RSL10 Product Information
Core Specification of the Product	5.0
Product Type (End Product, Subsystem, or Component)	End Product
Profiles Supported	Available in the Qualified Design Listing (QDL) information sheet.
Brand, Model, and QDID of the Product's Bluetooth SoC	QDID: 92528
	Declaration ID: D034220

APPLICATION NOTE

The BQTF will estimate the qualification test cost based on the information above and provide a quotation for testing. A list of all BQTFs can be obtained through the Bluetooth SIG. A Bluetooth Qualification Expert (BQE) from an authorized testing house can provide advice during the qualification test.

NOTE: ON Semiconductor used AT4Wireless for Bluetooth qualification and certification tests, including FCC, IC and CE.

3. Provide product samples to a BQTF for testing
Several product samples are required to be submitted for testing, including:

- ◆ Product sample for RF testing

These samples must be ready for conducted RF tests, so the product vendor will need to disconnect the antenna and use a 50 Ω SMA connector for the connection to test equipment. The product vendor will also need to provide instructions for entering Test Mode and for the Bluetooth low energy technology RF PHY test. These test samples will need an available UART interface.

- ◆ Product sample for profile test (optional for hearing aids)

If any adoptable profiles will be listed in QDL, a final product must be submitted for this test. Custom profiles do not require testing.

NOTE: You will need to provide a power supply connection for all samples, as a battery cannot support the current consumption in Test Mode for the duration of the test.

4. Create a new product listing. You will need to sign a Declaration of Compliance (DoC). Once the qualification process is done, your device is officially Bluetooth compliant. You may display the Bluetooth logo on your product.

Putting the RSL10 into Direct Test Mode

In order to put RSL10 into Direct Test Mode, you will need to flash the device with the Host Controller Interface (HCI) source code provided in the Direct Test Mode folder of the RSL10 development tools. For detailed instructions, refer to section 3 of *Getting Started with RSL10*.

Instead of the firmware file described in the manual, you will need to flash RSL10 with the HCI source code.

Emulating a UART Interface

RSL10 uses configurable digital input/output (DIO) pads which can be configured to provide a UART interface. For complete configuration instructions, please refer to the readme provided with the HCI sample code.

In this configuration, you can change to the other DIO. If headers are provided, you will need to connect two jumper wires onto the two DIO pads, and connect to a bi-directional level shifter. You will need this because RSL10's logic level is between 1.1 and 3.3 V depending on VDDO voltage level, which is not directly compatible with the RS232 cable. This set-up is shown in Figure 1.

Putting the RSL10-based Product into Test Mode:

1. Program RSL10 with HCI sample code using the Flash Loader.
2. Configure the DIO for UART interface pass through as described in the readme provided with the HCI sample application.
3. Connect the DUT, level shifter, RS232 USB adapter, and Bluetooth low energy test equipment as shown in Figure 1.
4. Configure the Bluetooth low energy test equipment, making sure the UART baud rate is 9600 kbps.

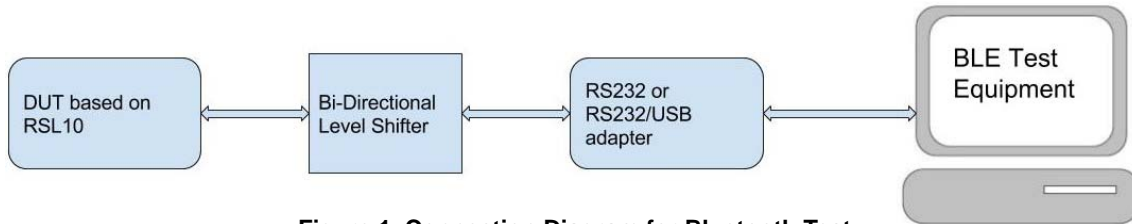


Figure 1. Connection Diagram for Bluetooth Test

NOTE: Pay particular attention to the filter used between the RF port and antenna on the RSL10 Evaluation & Development board to ensure maximum performance.

Manufacturer Configuration

When conducting the Bluetooth C/I performance test, the image frequency should be set for the 1 Mbps and 2 Mbps data rates. The image frequency suggested for the Bluetooth low energy 1 Mbps performance test is -2 MHz from the configured carrier frequency. The image frequency suggested for the Bluetooth low energy 2 Mbps performance test is -4 MHz from the configured carrier frequency.

When conducting the inter-modulation performance test the inter-modulation distance must be set. The recommended inter-modulation distance, 'n' is 3 for RLS10.

Certification Process

A Bluetooth product contains a wireless radio working at 2.4 GHz ISM band. In order to sell in different countries and regions, some certification tests must be passed.

Here is a list of certification tests required in specific countries or regions:

- United States of America (FCC)
- Canada (IC)
- Europe (CE)
- China (SRRC)
- Korea (KCC)
- Japan (JRF TELEC)

For detailed information on certification testing required in your country or region, please contact an authorized testing facility.


The RSL10 Evaluation and Development Board design has passed FCC certification and CE certification testing at AT4 Wireless lab. During the certification and emission test, ON Semiconductor used an off-the-shelf SMA antenna, ANT-2.4-CW-RAH-SMA-ND from Linx Technologies, which has 1.6 dBi peak gain. Please be aware in this test we had a cable connected to antenna with 1 dB loss.

NOTE: Pay particular attention to the filter used between the RSL10 evaluation board RF port and antenna for the appropriate emission.

Further Reading

For more information on the reference design, please refer to the documentation provided as part of the RSL10 development tools package.

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