# ON Semiconductor

# Is Now

**To learn more about onsemi™, please visit our website at**
**www.onsemi.com**

# AND9838/D

# Bluetooth® Certification Guidelines for EZAIRO® 7160 SL-Based Products

ON Semiconductor®

www.onsemi.com

APPLICATION NOTE

## INTRODUCTION

In order to sell a Bluetooth enabled device, there is a need for compliance and certification. 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 product based on the Ezairo 7160 SL hybrid.

Once the design of a product based on Ezairo 7160 SL is complete, the product must be qualified before it can be ready for release to market. The ON Semiconductor RSL10 Qualification Design Identification (QDID) and profiles can be referred to and re−used when a new end product listing is created.

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 at: https://www.bluetooth.com/develop−with−bluetooth/qualification−listing .

### Qualification Process

1. Become a Bluetooth SIG member and purchase a Declaration ID.
   Detailed information can be found on the Bluetooth SIG website (https://www.bluetooth.coms/develop−with−bluetooth/qualification−listing).
2. Prepare product information and submit to a Bluetooth Qualification Test Facility (BQTF). The BQTF will estimate the qualification test and procedure costs.
   The BQTF requires that following information be prepared and submitted:

- Core specification of the product

  NOTE: For products based on Ezairo 7160 SL, this is 5.0.

- Product type (end product, subsystem, or component)

  NOTE: For products based on Ezairo 7160 SL, this is “end product”.

- Profiles supported

  NOTE: For hearing aids, this is optional. Please check all the profiles that will be supported when the product is released in the Qualified Design Listing (QDL) information sheet. The profiles supported and tested by ON Semiconductor can be found at: https://launchstudio.bluetooth.com/ListingDetails/6253

- Brand, model, and QDID of the product’s Bluetooth SoC

  NOTE: The Ezairo 7160 SoC includes the RSL10 radio IC from ON Semiconductor. The QDID for the RSL10 is 92528, while the declaration ID for the Ezairo 7160 SL is D034220.

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 DEKRA Testing and Certification, S.A.U. for Bluetooth SIG testing, and Nemko North America, Inc., for FCC, IC and CE compliance testing. In addition, ON Semiconductor used Swift Labs Inc. to coordinate and assist with lab testing submissions.

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. Therefore, the antenna must be disconnected by the vendor, and a 50 Ω SMA connector used to connect it to the test equipment. Additionally, instructions for entering Test Mode and for conducting the Bluetooth Low Energy RF PHY test must be provided by the product vendor. These test samples require that a UART interface is available.

- Product sample for profile test (optional for hearing aids)
  In order for adoptable profiles to be listed in the QDL, a final product must be submitted for testing. Custom profiles do not require testing.

NOTE: A power supply connection must be provided 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. A Declaration of Compliance (DoC) must be signed. Once the qualification process is complete, the device is officially Bluetooth compliant, and the Bluetooth logo may be displayed on the product.

### Putting the RSL10 Radio IC into Test Mode

In order to put the radio IC into Test Mode, the Test Mode firmware must be flashed onto the Ezairo 7160 SL hybrid. This can be done using the DTM configuration tool, which streamlines the process of updating the firmware images of both Ezairo 7100 and RSL10. Usage instructions for this tool are contained within its readme file.

*Connecting the Tester to the DUT*

The tester's UART interface must be connected to the DUT. There are two options to make this connection, depending on which hybrid pads are exposed: the tester can be connected either to two RSL10 DIOs directly or to two Ezairo 7100 DIOs which are then relayed to RSL10.

Two wires must be soldered onto the selected pads, and connected to a level shifter since the logic level of the Ezairo 7160 is 2 V, which is not compatible with that of the RS−232 interface. This setup is shown in Figure 1.

1. To connect to RSL10 requires access to pads RFIO2 (F4) and RFIO3 (F6). In this configuration, connect the tester's level−shifted UART TX to RFIO2 and the UART level−shifted RX to RFIO3.
2. To connect to Ezairo requires access to pads DIO24 (D10) and DIO29 (C10). In this configuration, connect the tester's UART level−shifted TX to DIO24 and UART level−shifted RX to DIO29.

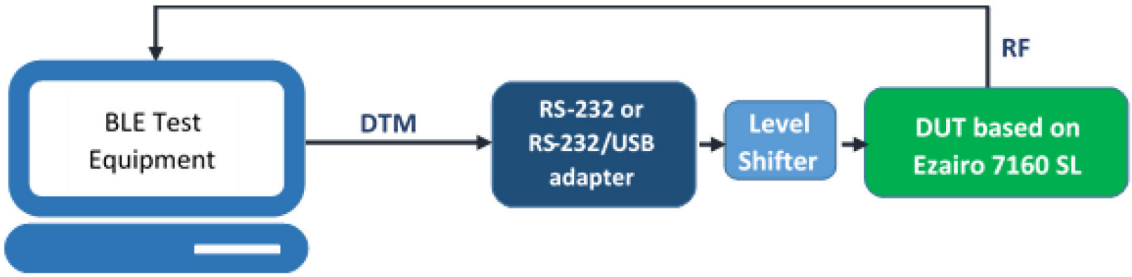


**Figure 1. Connecting Diagram for Bluetooth Test**

### 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 operating in the 2.4 GHz ISM band. In order to sell such a product 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/ISED)
- Europe (CE)
- China (SRRC)
- Korea (KCC)
- Japan (JRF TELEC)

For detailed information on the certification testing required in other countries or regions, please contact an authorized testing facility.

The Ezairo 7160 SL Hybrid Demonstrator Board has passed FCC and CE certification testing at Nemko North America, Inc. 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.

### Further Reading

Bluetooth qualification and certification test reports for the Ezairo 7160 SL are available on request for reference. Please contact your account manager or sales representative for more information.



**PUBLICATION ORDERING INFORMATION**

**LITERATURE FULFILLMENT**:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
**Phone**: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
**Fax**: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
**Email**: orderlit@onsemi.com

**N. American Technical Support**: 800−282−9855 Toll Free USA/Canada
**Europe, Middle East and Africa Technical Support:**
Phone: 421 33 790 2910

**ON Semiconductor Website**: **www.onsemi.com**

**Order Literature**: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative