User Manual for the P0003437 Interface Board containing the A0003419 External BLE Circuit in Encore

1. **Purpose**

The purpose of this document is to provide usage and background information on the P0003437 PCB Assembly containing the Ergotron A0003419 External BLE Circuit (hereafter called A0003419 External BLE Circuit) which is contained within the Encore workstation.

2. **Circuit Description**

The A0003419 External BLE Circuit is an RF circuit contained on the P0003437 PCB Assembly developed by Ergotron for the purposes of wireless BLE communications using the proprietary BLE wireless communication standard. The A0003419 External BLE Circuit provides BLE wireless communications between the Encore workstation and another BLE enabled device such as a smartphone, tablet, BLE Beacon or other BLE-enabled device. The central component in the A0003419 External BLE Circuit is the Nordic Semiconductor nRF52832 2.4 GHz BLE, proprietary 2.4 GHz and ANT-capable System on Chip integrated circuit.

3. **Integration of the P0003437 PCB Assembly into Encore**

The P0003437 PCB Assembly mounts, with appropriate screws and standoffs, to the P0003331 Main Power Board that is part of the Encore A0003419 Power System Assembly in the electronics compartment inside the head unit of the Encore. Board to Board connectors provide power from the P00033331 board to the P0003437 board as well as pass digital control lines and analog measurement signals between the two boards.   Power to the P0003437 PCB Assembly comes in on connector J8, which is further regulated to power the A0003419 External BLE Circuit (reference the P0003437 Block Diagram).

P0003437 PCBA

P0003331 PCBA
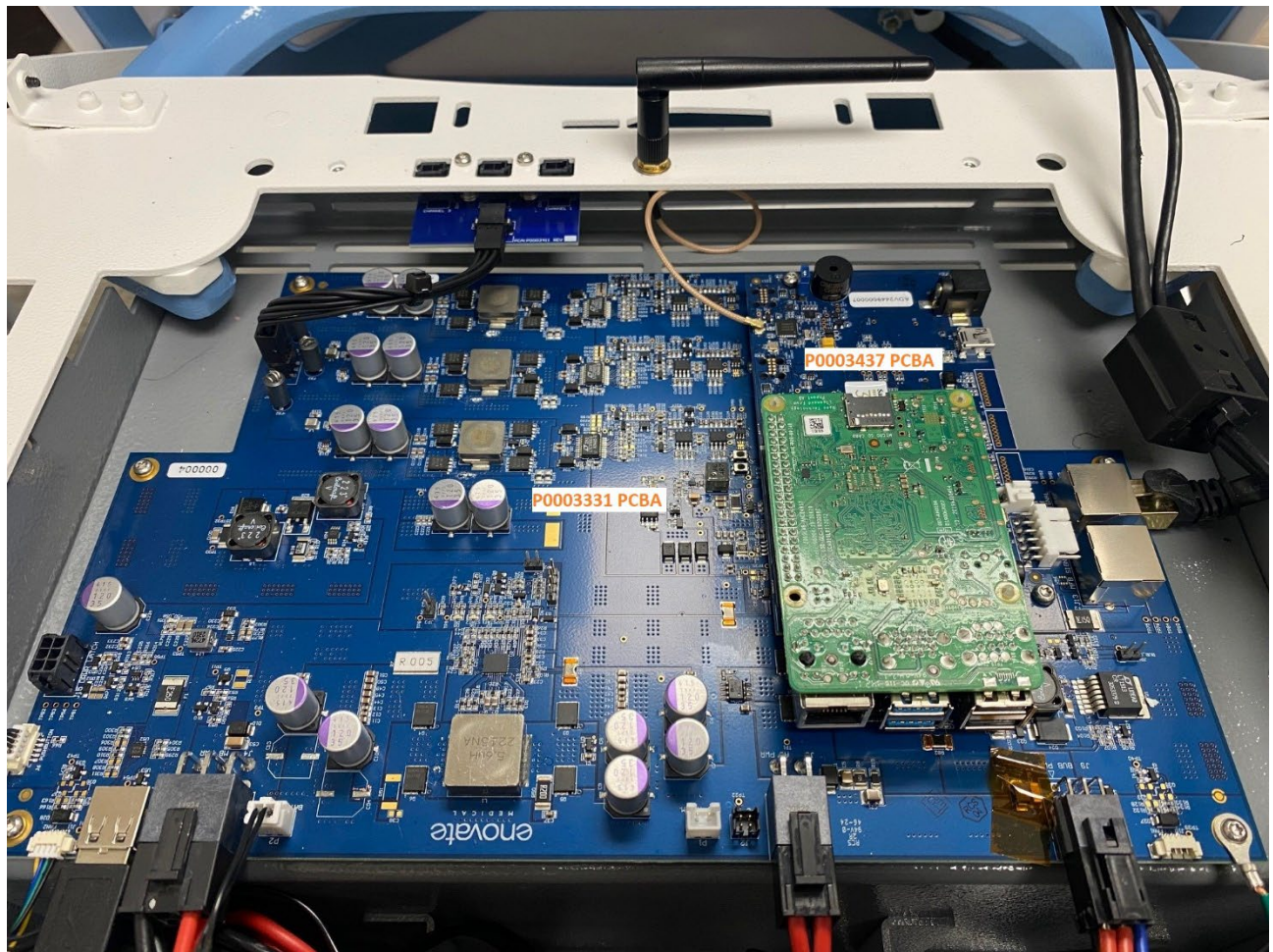
The A0003419 External BLE Circuit operates with an attached Aristotle RFA-25-C2M2-U-M70 antenna with Reverse-Polarity SMA connector that connects via an 170mm RG178 RF coaxiable cable onto U.FL connector J16 on the P0003437 board.

At no point should any part of the P0003437 board be altered as this will invalidate any existing compliance work.

The below photo shows the location of the A0003419 External BLE Circuit and Aristotle antenna in the Head of the Encore workstation:
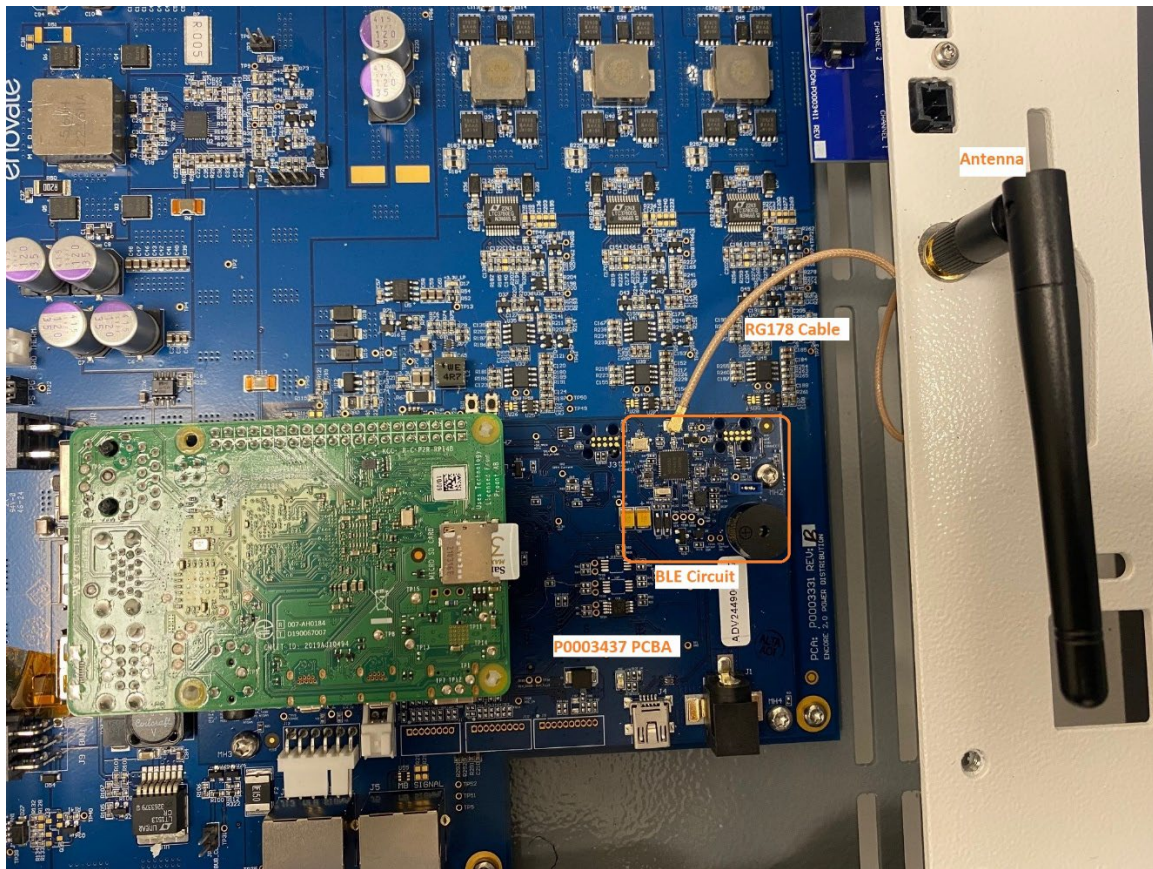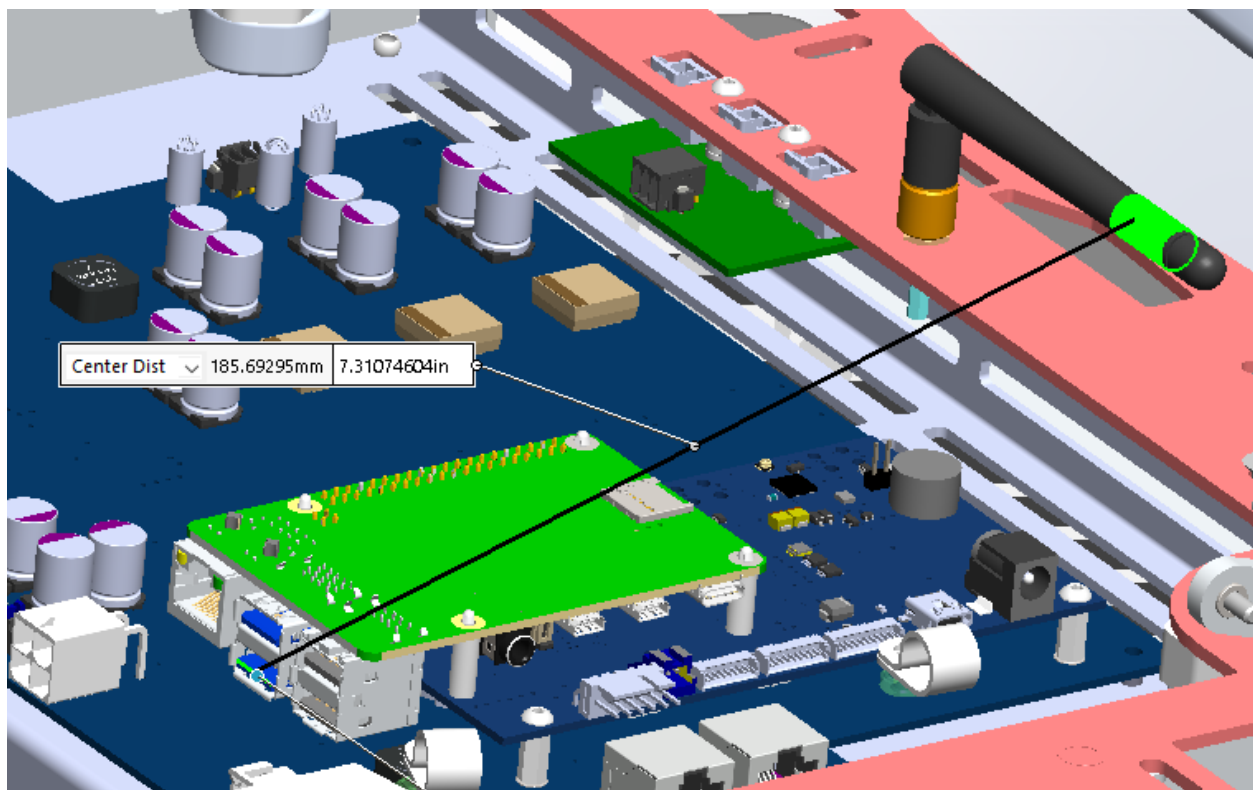
Module & Antenna Placement

Separation distance of 100mm exists between the External BLE Circuit's antenna and the Raspberry Pi's WiFi/Bluetooth PCB antenna.
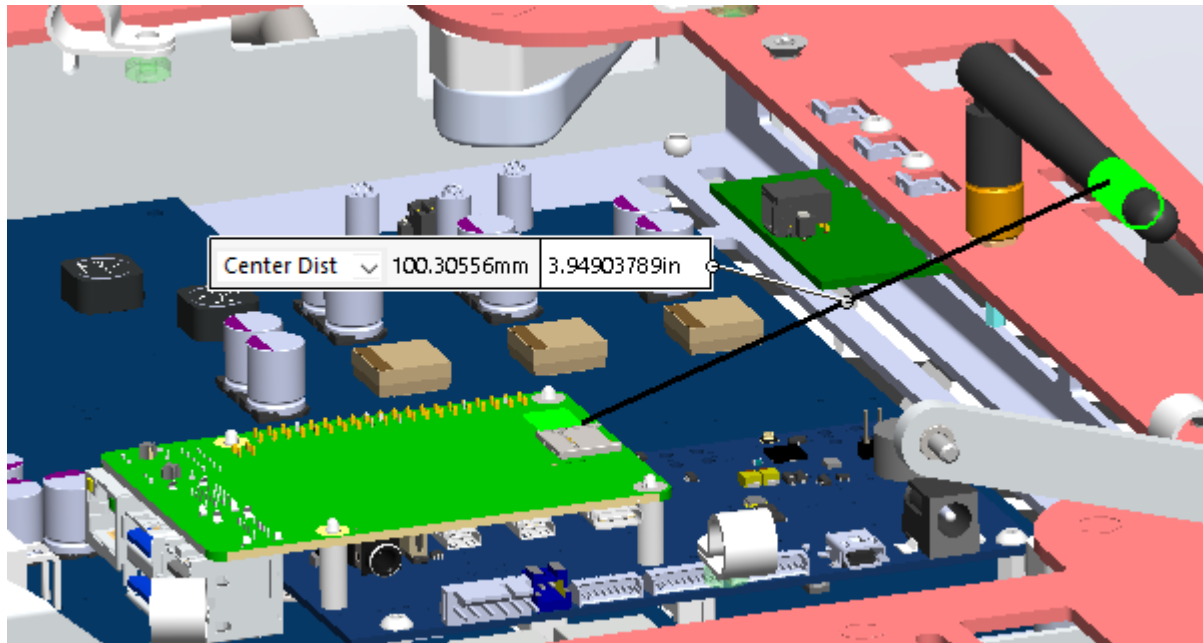
Separation distance of 185mm exists between the External BLE Circuit's antenna and the BrosTrend USB WiFi antenna.

4. End Product Labeling

A label is to be fitted to the exterior of the Encore workstation which contains the A0003419 External BLE Circuit. The label must contain the words "FCC ID: 2AVU2-A0003419" (for FCC) and "IC: 25915-A0003419" (for ISED).

FCC

A0003419 External BLE Circuit with FCC ID: 2AVU2-A0003419

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received including interference that causes undesired operation.

Caution: Any changes or modifications to this equipment not expressly approved by Ergotron could void the user's authority to operate the equipment.

This equipment has been tested and found to comply within the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: (1) Re-orient or relocate the receiving antenna (2) Increase the separation between the equipment and receiver (3) Connect the equipment into an outlet on a different circuit from that to which the receiver is connected (4) Consult the dealer or an experienced radio/TV technician for help.

This device and its antenna(s) must not be co-located or operated in conjunction with any other antenna or transmitter except in accordance with FCC's multi-transmitter procedures.

IMPORTANT NOTE: FCC Radiation Exposure Statement; Co-location of this module with other transmitter that operate simultaneously are required to be evaluated using the FCC multi-transmitter procedures. This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

ISED

A0003419 External BLE Circuit with IC: 25915-A0003419

This device complies with Industry Canada license-exempt RSS Standard(s). Operation is subject to the following two conditions: (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. Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

The device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures.

Cet appareil et son antenne(s) ne doit pas etre co-localises ou fonctionnement en association avec une autre antenne ou transmetteur.

IMPORTANT NOTE:

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum separation distance of 2cm between the device and all persons.

Cet equipment est conforme aux limites d'exposition au rayonnement IC RSS-102 definies pour un environnement non controle. Cet equipement doit etre installe et utilize avec une distance de separation minimale de 2cm entre l'appareil et toutes les personnes.

Integration Information for the OEM

The P0003437 PCBA and Antenna are to be installed by Ergotron personnel. It is the responsibility of Ergotron, Inc. to ensure that the P0003437 PCB along with the antenna are integrated in such a way as to ensure continued compliance to FCC and ISED Canada certification requirements once installed in the Ergotron Host product.

Changes in Usage Conditions of this Limited Module

This device has been approved as a portable device in accordance with FCC and ISED Canada requirements. This means that there must be a minimum separation distance of 2cm between the Limited Module's antenna and any persons.

A change in use that involves a separation distance ≤2cm (Portable usage) between the Module's antenna and any persons is a change in the RF exposure of the module and, hence, is subject to a FCC Class 2 Permissive Change and a ISED Canada Class 4 Permissive Change policy in accordance with FCC KDB 996396 D01 and ISED Canada RSP-100.

As noted above, this device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures. If the device is co-located with multiple antennas, the module could be subject to a FCC Class 2 Permissive Change and a ISED Canada Class 4 Permissive Change policy in accordance with FCC KDB 996396 D01 and ISED Canada RSP-100.

In accordance with FCC KDB 996369 D03, section 2.9, test mode configuration information is available from the Module manufacturer for the Host (OEM) product manufacturer. This test mode configuration information is included in Appendix A at the end of this User Manual.
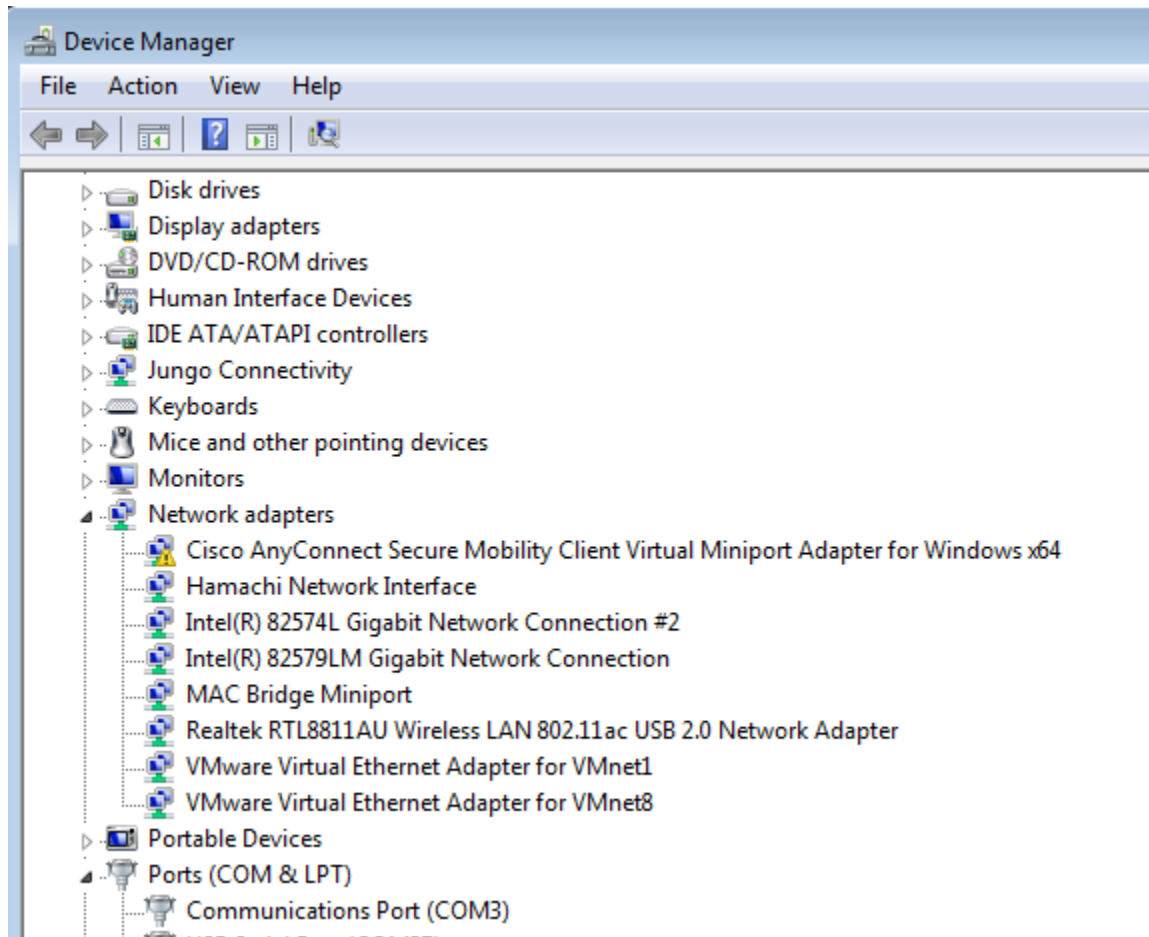
Appendix A

P0000457 External BLE Circuit
Configuration And Test Modes

1. **Turn on the All-In-One PC.**
2. **Connect a micro-USB cable from the PC to the Artik P00000457 hardware.**
3. **Power on the P00000457 hardware.**
4. **Open Putty application on the All-In-One PC.**
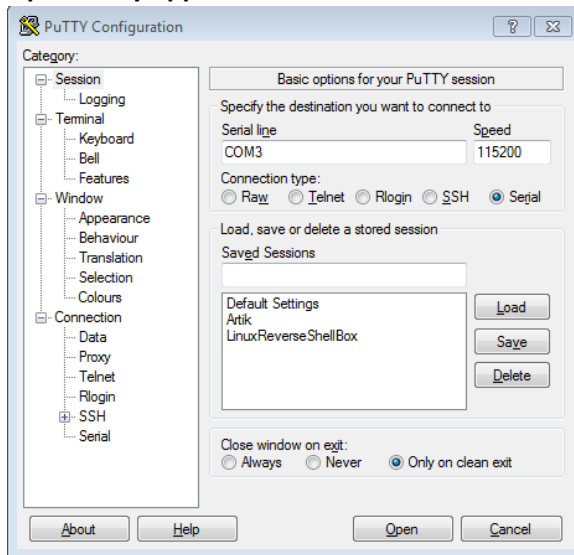
Set Speed to 115200, and Serial Line to COM#, where # is the COM# of the hardware listed in Device Manager on the PC (see below).

5. **Hit Open**
6. **Type in** *root* **if prompted for a username or password and then hit enter.**
7. **Type** *minicom -s*
8. **In minicom setup, enter the following settings:**
   - *port /dev/ttySAC5*
   - *Baud 115200, no parity, 1 stop bitF*
   - *No hardware flow control*

9. **Save minicom setup settings and hit enter.**
10. **Select "Exit"**
11. **You are now connected to the nRF through UART from the Artik in Radio Test Mode.**

The Radio Test app/firmware allows you to configure the radio as a constant RX/TX carrier, modulated TX carrier, and RX/TX sweep. The tests are controlled with simple one-letter commands via the serial port. At any time during the tests, you can set the radio parameters output power, bit rate, and channel. You can also set the time on each channel in sweep mode, in steps of 1 millisecond from 1 millisecond to 99 milliseconds.

The application starts with enabling the 16 MHz crystal oscillator and configuring the UART and interrupts. The main loop waits until it receives a command through the UART. Then it initiates the requested command.

The following one-letter commands are available:

- a: **Enter start channel for sweep/channel for constant carrier.**
- b: **Enter end channel for sweep.**
- c: **Start TX carrier.**
- d: **Enter time on each channel (1 ms - 99 ms).**
- e: **Cancel sweep/carrier.**
- h: **Display these commands (help/usage)**
- m: **Enter data rate.**
- o: **Start modulated TX carrier. (*transmit pseudorandom bit sequence*)**
- p: **Enter output power.**
- s: **Print current delay, channels and so on.**
- r: **Start RX sweep.**
- t: **Start TX sweep.**
- x: **Start RX carrier.**
- 1: **Turn gain amplifier on**
- 2: **Turn gain amplifier off**
- 3: **Set gain low**
- 4: **Set gain high**
- 5: **Select on-board antenna**
- 6: **Select external antenna**
- 7: **Display amp/antenna configuration**

The text "RF Test" should appear at the top of the terminal after completing step 10.

Type any of the letters described above. An output text should be displayed in the PUTTY window, or a sweep or signal should be started.