CyBluetool User Guide

Document Number: 002-25714 Rev. **

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Contents

1. Device Setup

This guide contains instructions for using the Cypress CyBluetool software to conduct regulatory tests on devices equipped with Cypress Bluetooth chips.

1.1 Installation

OS	Installer Location
Windows (x86 and x64)	https://community.cypress.com/community/wiced-studio-blueooth/wiced-studio-bluetooth-docs-downloads
Ubuntu – x64	https://community.cypress.com/community/wiced-studio-blueooth/wiced-studio-bluetooth-docs-downloads

1.1.1 Windows

1.1.1.1 Installing CyBluetool

1. Download the CyBluetool Installer file for Windows from the release path as shown in the table above. Double-click the downloaded Installer file to launch it. In the welcome screen, click **Next**.
2. Select the path where you want CyBluetool to be installed and click **Next**.
3. Select the components to be installed. By default, both CYBTSP and CyBluetool will be selected. If you are not using the CyBtsp client to write test scripts, deselect the CYBTSP component. Click **Next**.
4. Read through the license agreements and select 'I accept the licenses', to continue with the installation.
5. Select the Start Menu in which you would like to create the shortcut and click **Next**.
6. The amount of disk space required by the tool will be displayed. Click **Install** to complete the installation.

1.1.1.2 CYBTSP Client

If you selected the CYBTSP component during installation, do the following to set up the CYBTSP Client.

1. Install the following software required to use the CYBTSP Client.

Dependency	Installer Location
ActivePerl v5.84	\\samba.aus.cypress.com\projects\blueth_release\BroadcomInternal\BLUETOOL \ActivePerl-5.8.4.810-MSWin32-x86.msi or http://iot-webserver.aus.cypress.com/projects/blueth_release/BroadcomInternal/BLUETOOL/ ActivePerl-5.8.4.810-MSWin32-x86.msi
Visual C++ Redistributable for Visual Studio 2015	https://www.microsoft.com/en-us/download/details.aspx?id=48145

2. Copy the contents of the *cybtsp* folder in the CyBluetool installation directory to *<perl installation path>\Perl\site\lib* directory.

1.1.2 Linux

1.1.2.1 Installing Qt

CyBluetool installer does not package the Qt runtime binaries required to run the tool. Do the following to download and install Qt.

1. Go to https://www.qt.io/ and download the Qt installer for your platform. Qt supports commercial and LGPL license versions. Choose the license version that meets your need.
2. Run the installer and install Qt libraries for version 5.9.

1.1.2.2 Installing CyBluetool

1. Download the CyBluetool installer for the Ubuntu-x64 platform the release folder and double-click on the executable to run the installer. Follow the instructions to complete the installation.
2. Copy the required Qt binaries to CyBluetool install directory (by default, Qt is installed in *~/Cypress/CyBluetool* folder). Download the Linux deploy qt tool from https://github.com/probonopd/linuxdeployqt/releases.
3. Open a terminal to the installation folder and run the following commands to copy the required Qt runtime libraries:

   ```
   ~/Downloads/linuxdeployqt-continuous-x86_64.AppImage cybluetool -no-plugins -no-translations
   -qmake =/opt/Qt/5.9.1/gcc_64/bin/qmake
   ```

   Note: Path to `linuxdeployqt-contitnuous-x86_64.AppImage` and `qmake` may be different on your machine. Modify the above command appropriately.
4. Run `./cybluetool.sh` to run the CyBluetool GUI app.

   Note: DO NOT run the CyBluetool executable directly. Always run the `cybluetool.sh` script.

1.1.2.3 Installing the USB Driver

1. Copy the Linux driver from http://iot-webserver.aus.cypress.com/projects/cybluetool/drivers/linux/btusb.zip to your computer.
2. Unzip the btusb driver package.
3. Navigate to the *btusb* directory and run the following command to build the driver:

   ```
   $ sudo make
   ```
4. Execute the following script to install the driver:

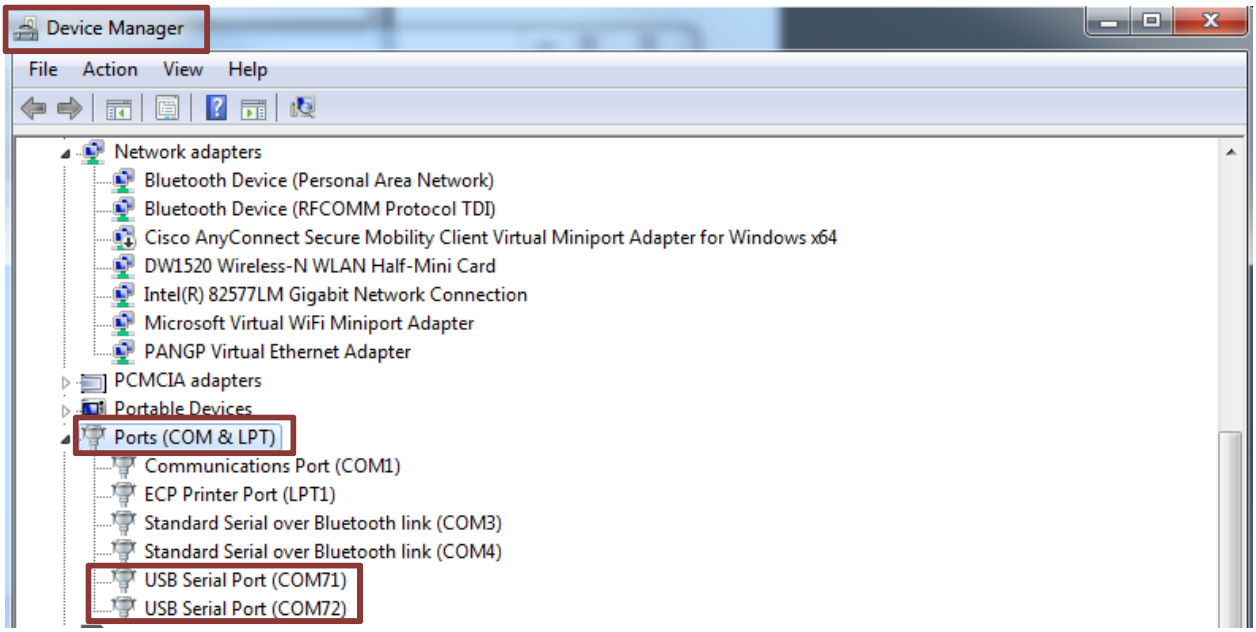
   Note: This script will remove BlueZ if already installed.

   ```
   $ sudo ./install.sh
   ```

1.2 UART Connection Setup

1. Open Windows Device Manager.
2. On Device Manager, navigate to the **Ports (COM &LPT)** group and expand it.
3. Plug the corresponding USB connector from the host PC to the device under test (DUT).

   The COM port corresponding to the device should now appear.
4. If two COM ports appear for the device, use the lower COM port for device connection (i.e., select COM71 instead of COM72).



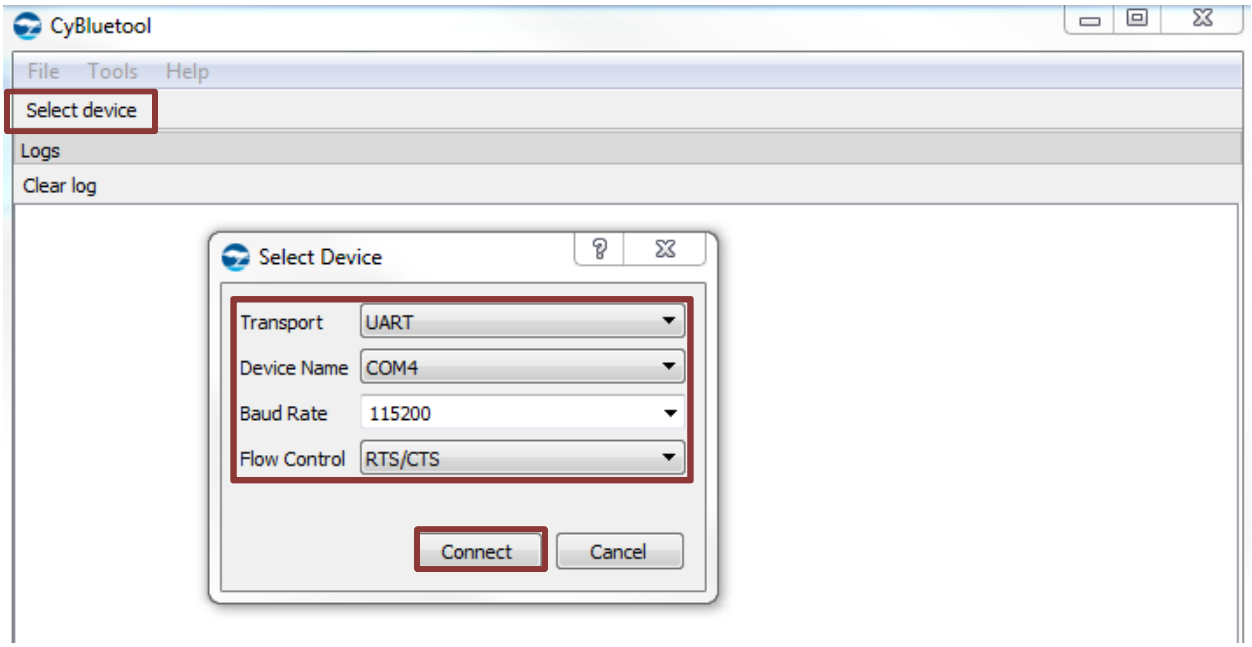
1.3 USB Connections

The corresponding USB port will depend on the order of the cypress device connected to the Host PC. The first device will have port **usb0**, and the second device will use port **usb1….** However, note that there is no display for which port the device is connected to.

1.4 CyBluetool Device Connection

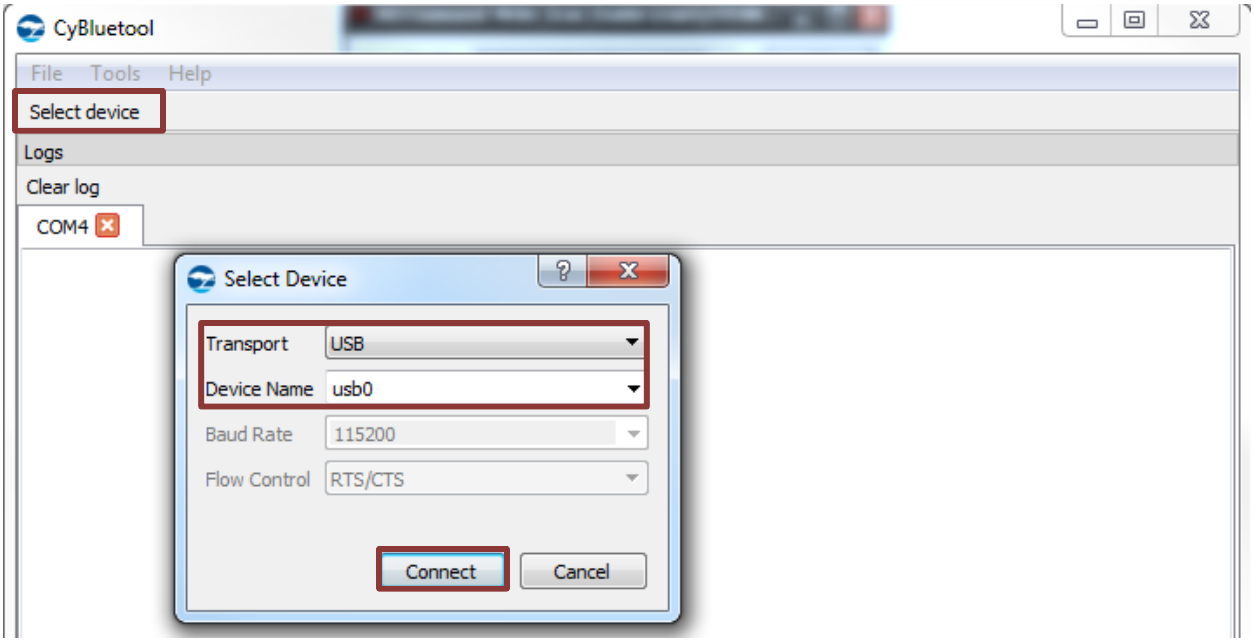
1.4.1 UART Interface

1. Open CyBluetool.
2. Click **Select device**.
3. On the Select Device window, set the following and then click **Connect**.
   - Transport: Select “UART”.
   - Device name: Select the COM port of the DUT.
   - Baud Rate: Enter “115200” (standard baud rate).
   - Flow Control: Select “RTS/CTS”.



1.4.2 USB Interface

1. Open CyBluetool.
2. Click **Select device**.
3. On the Select Device dialog, set the following and then click **Connect**.
   - Transport: Select **USB**.
   - Device name: Select the USB port corresponding to the DUT (i.e., usb0).

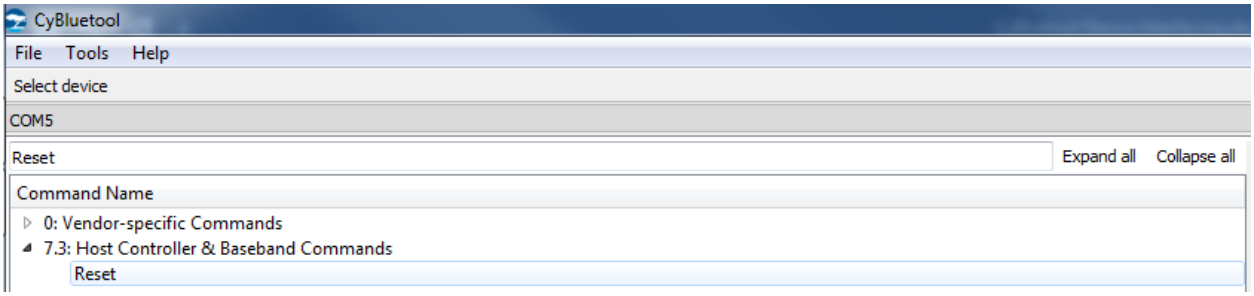


1.5 Reset the Device Under Test

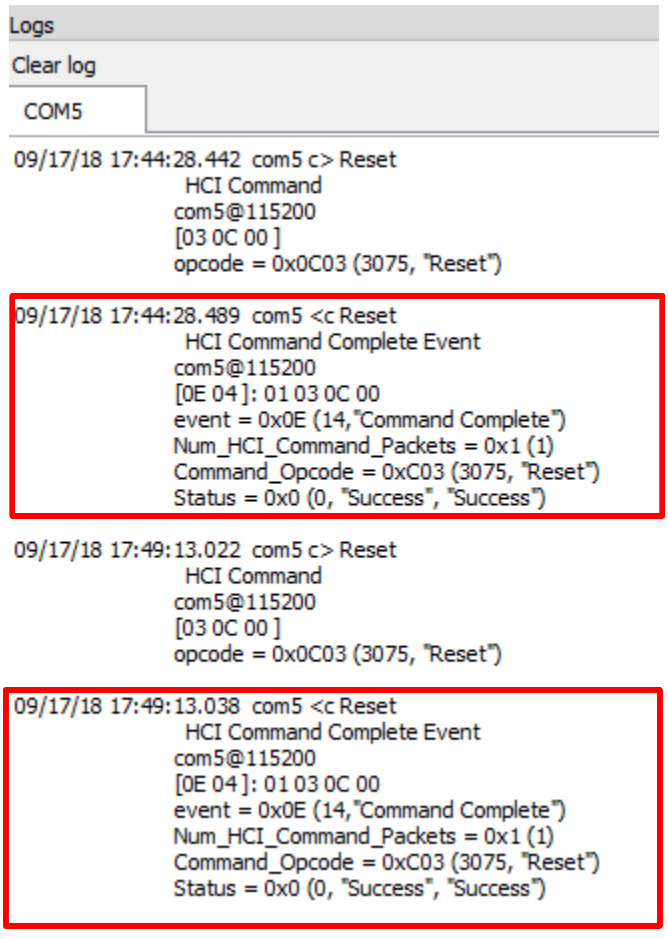
Note: The Device Under Test (DUT) should be reset before each procedure.

Tip: Search for commands using the search bar or by expanding the different tabs.

1. Double-click on **Reset** to issue the command, do this command twice.



2. Check the **Log window** to confirm DUT Reset is successful both instances. If successful, the Host PC can communicate with the DUT using HCI controls.



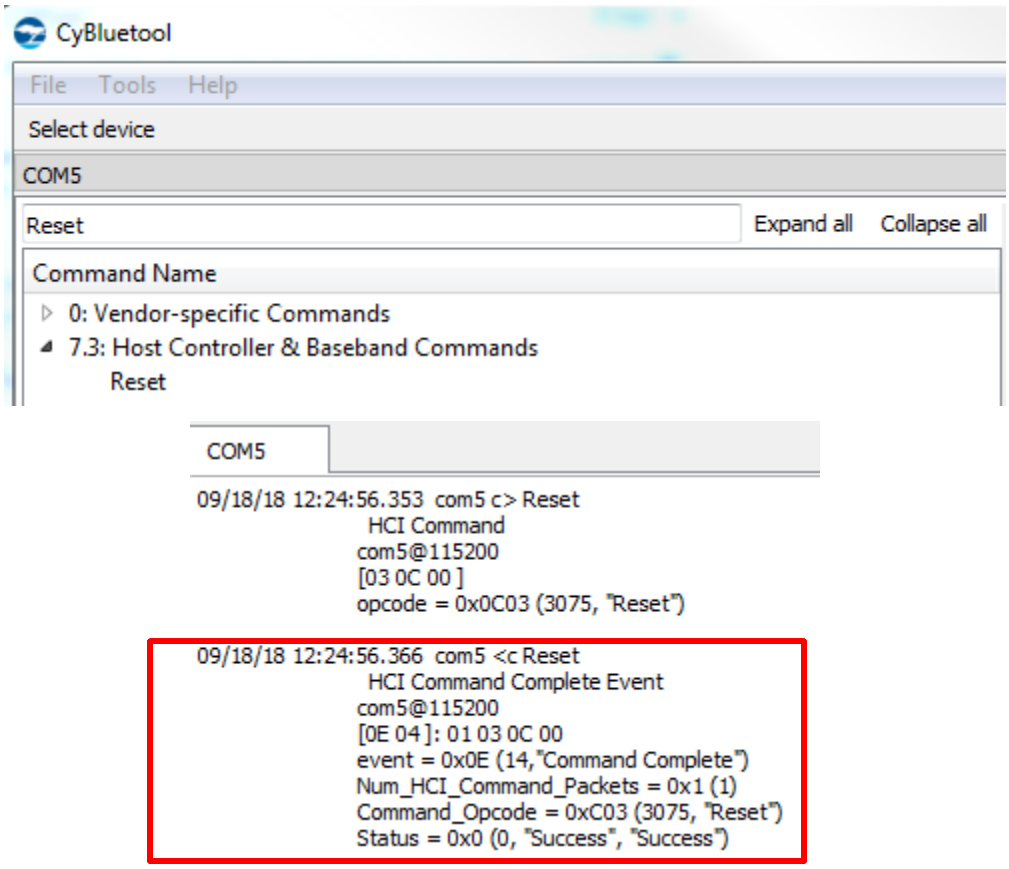
1.6 Downloading Firmware

1.6.1 CYW920719 Firmware Download Requirements (Autobaud Mode)

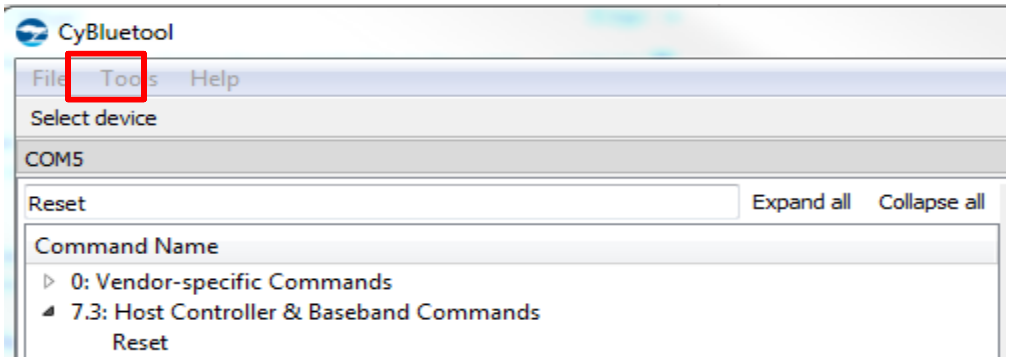
To download firmware on CYW920719 chips, auto-baud mode is required. When CTS is low, **release reset** to enable auto-baud mode.

1.6.2 Firmware Download

1. Double-click **Reset** and verify that the Log window echoes **"*Success*"**. Skip this step if device uses auto-baud mode.



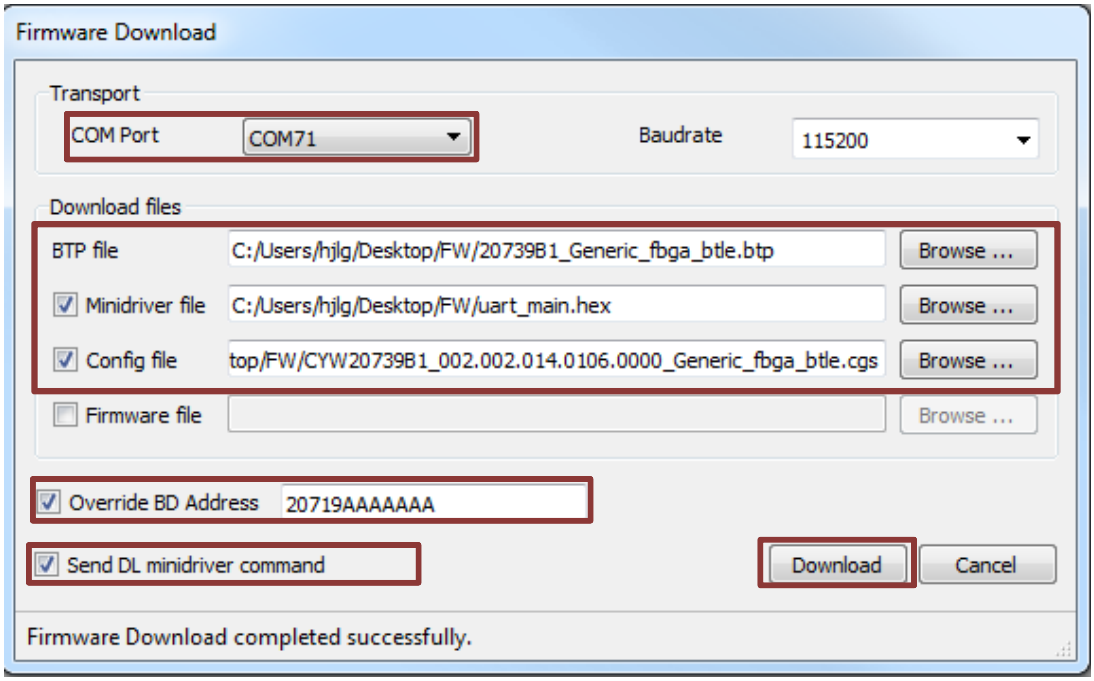
2. On the top left corner of CyBluetool, click **Tools** > **Firmware Download**.



3. On the Firmware Download dialog, set the following:
   - Com Port: Select the COM port for your device (Refer to Section 2.1).
   - BTP File: Load the provided *.btp* extension file.

- Minidriver file, Config file and Firmware file requirements are device-dependent. Check the box and load the files necessary for your device.
- Override BD Address: Check the box and input a 12-letter BD Address of choice.
- Send DL minidriver command: Always check this box.

4. Click **Download** and wait for the download to complete.

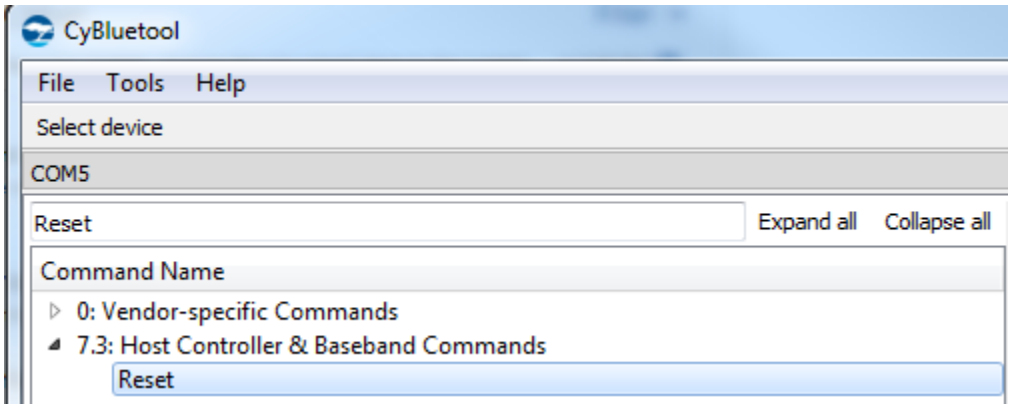


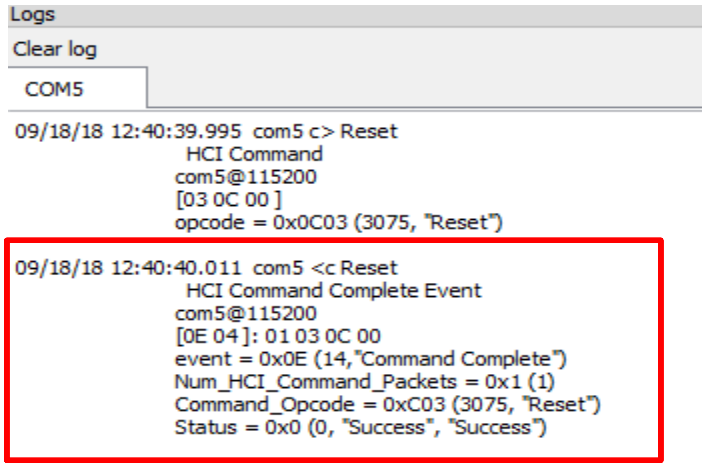
1.6.3 Verifying Firmware Download

1. For devices using flash memory, power cycle your device.

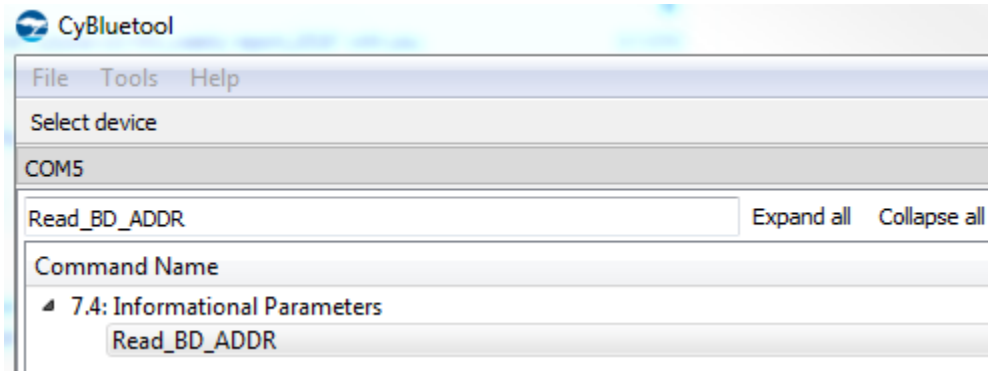
   Note: Skip this step if your device uses RAM.

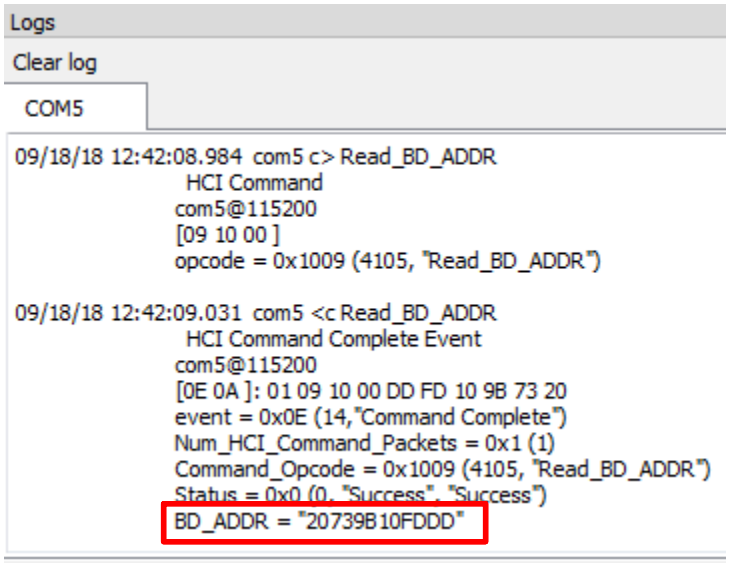
2. Reconnect the device to CyBluetool.
3. Double-click **Reset** and verify that the log window echoes “Success”.





5. Double-click **Read_BD_ADDR**.

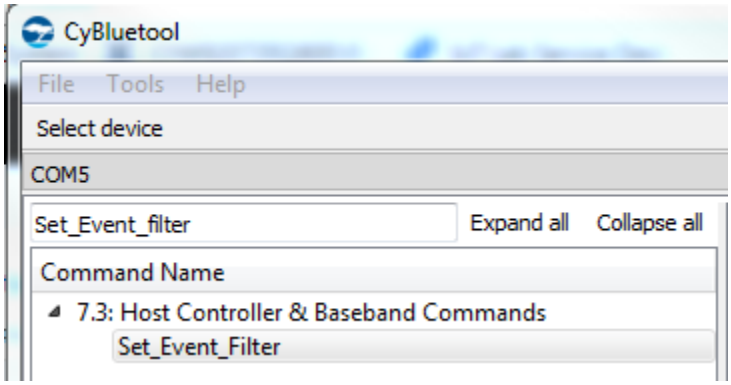




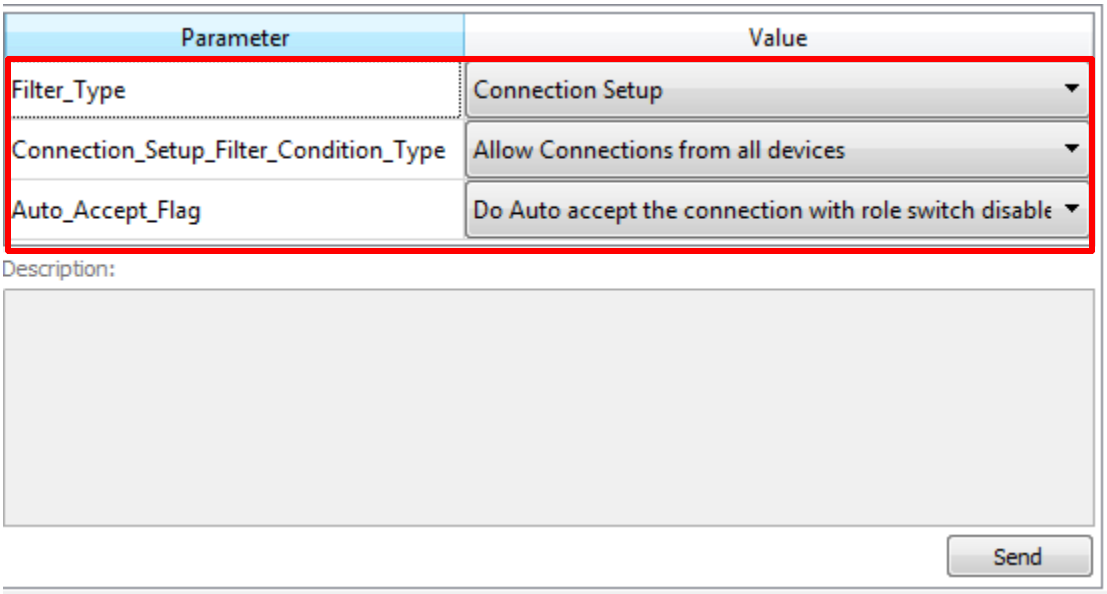
6. Verify that the BD_ADDR echoed in the Log window is the same as the BD_ADDR inputted when downloading the firmware (Refer to Section 4.2→Step 6.)

1.7 Enabling Test mode

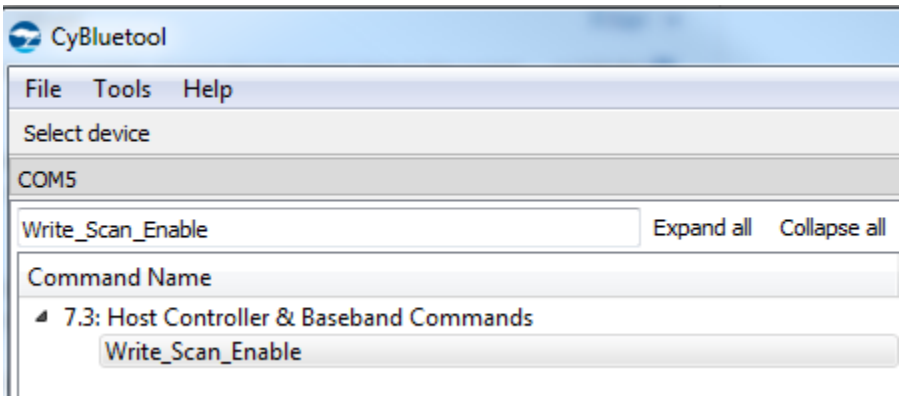
1. Click **Set_Event_Filter** to open the settings menu on the right-hand side.



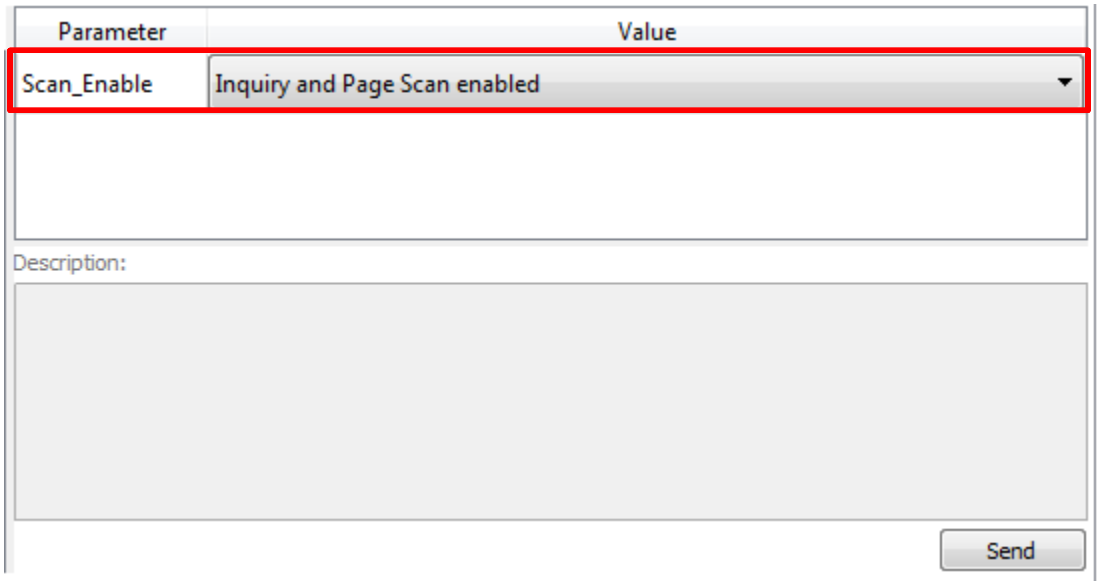
2. Make the following changes and click **Send**:
   - Filter_Type: Select **Connection Setup**.
   - Connection Setup Filter Condition Type: Select **Allow Connection from all devices**.
   - Auto Accept Flag: Select **Do Auto accept the connection with role switch disabled**.



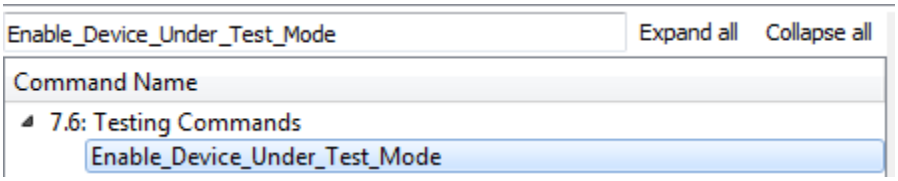
3. Click **Write_Scan_Enable** to open the settings menu on the right-hand side.



4. For the Scan_Enable parameter, select **Inquiry and Page Scan Enabled** and click **Send**.



5. Double-click **Enable_Device_under_test_mode** to issue the command.

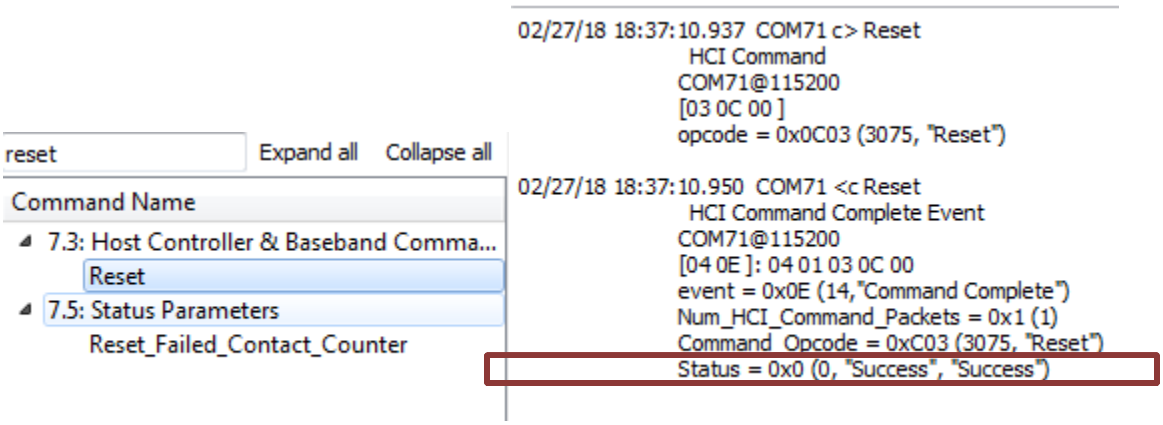


2. BT Throughput Test

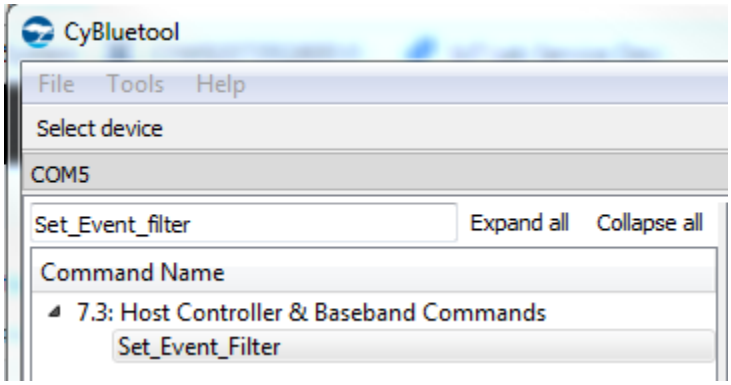
2.1 Put Device 1 in Discoverable Mode (Slave)

1. Double-click **Reset** to issue a device reset.

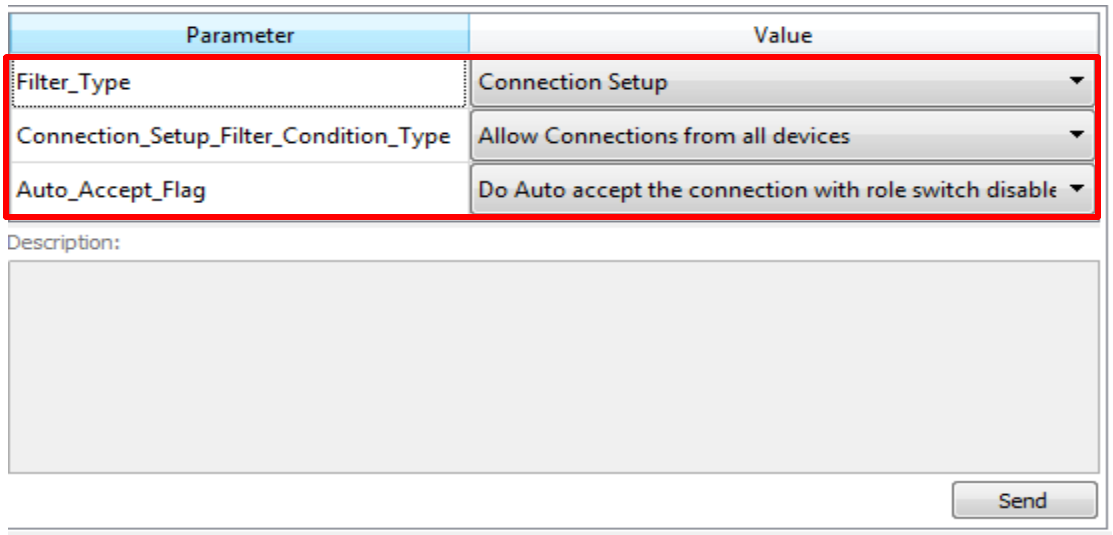
   Note: Device reset should always be performed at the beginning of device use.



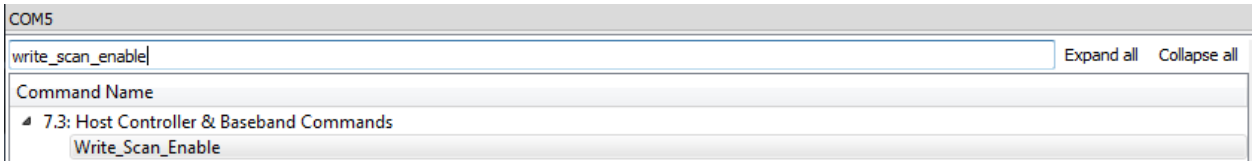
2. Click **Set_Event_Filter** to open the settings menu on the right-hand side.



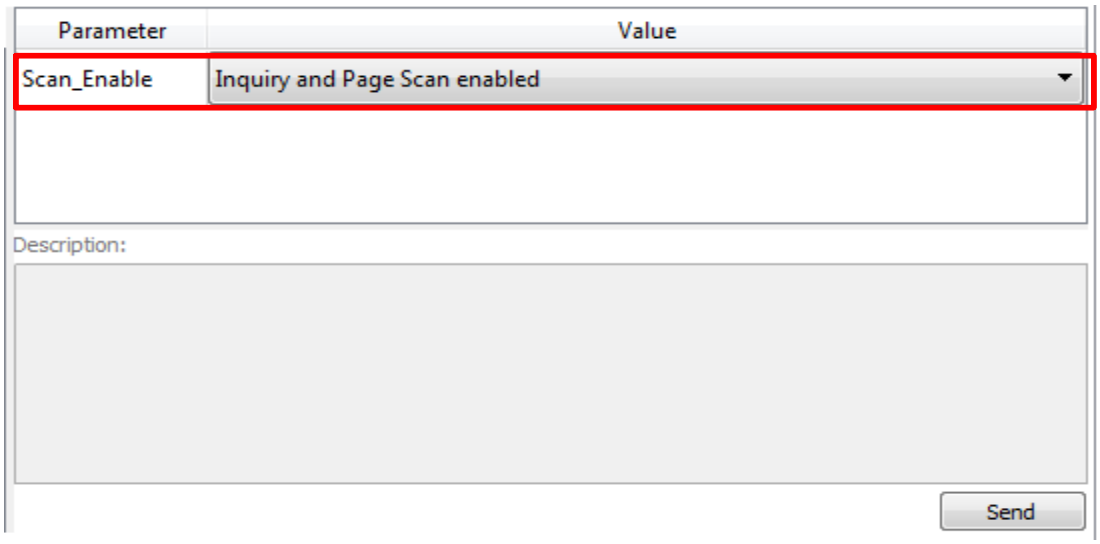
3. Make the following changes and click **Send**.
   - Filter_Type: Select **Connection Setup**.
   - Connection Setup Filter Condition Type: Select **Allow Connection from all devices**.
   - Auto Accept Flag: Select **Do Auto accept the connection with role switch disabled**.



4. Click **Write_Scan_Enable** to open the settings menu on the right-hand side.

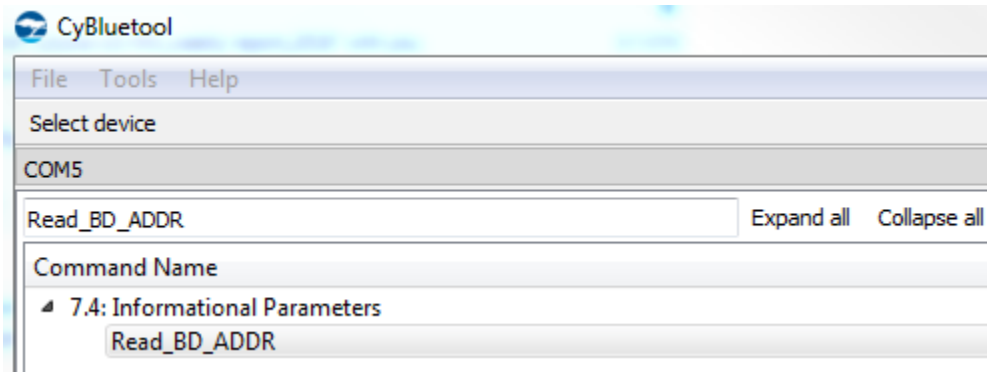


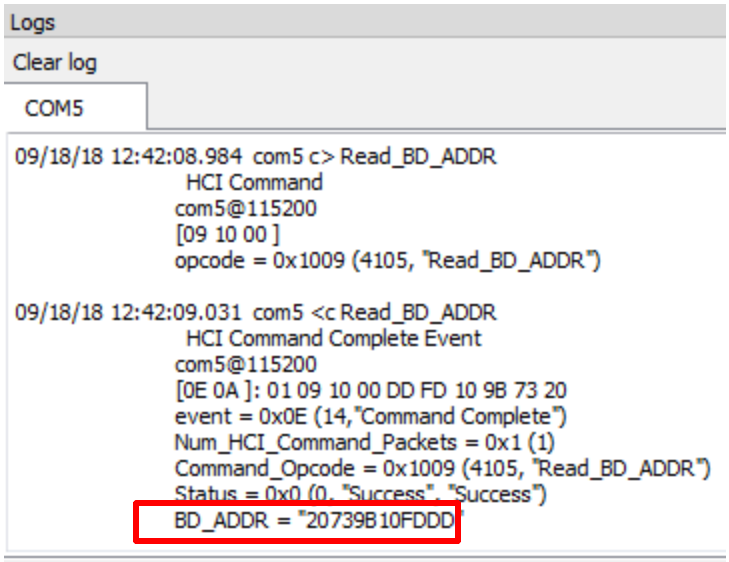
5. For the Scan_Enable parameter, select **Inquiry and Page Scan Enabled** and click **Send**.



6. Double-click **Read_BD_ADDR**.

   The BD ADDR is required for the next part to create a connection.

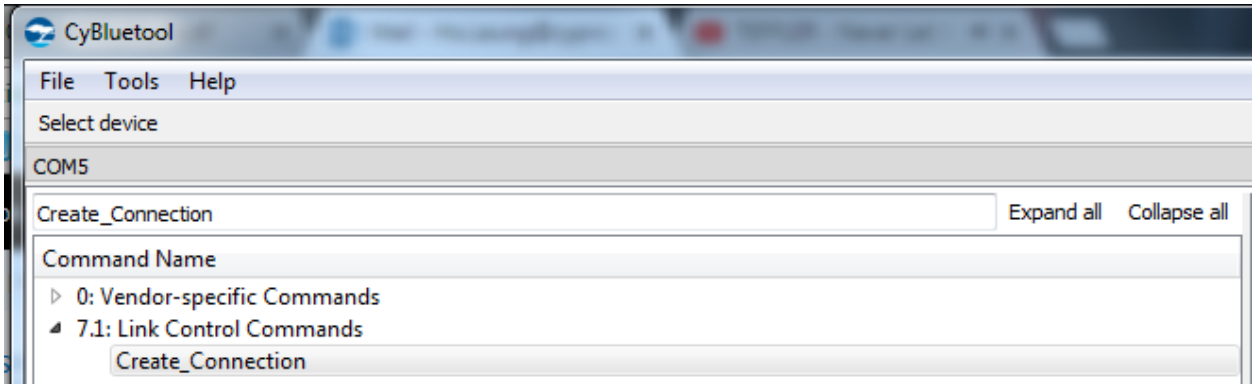




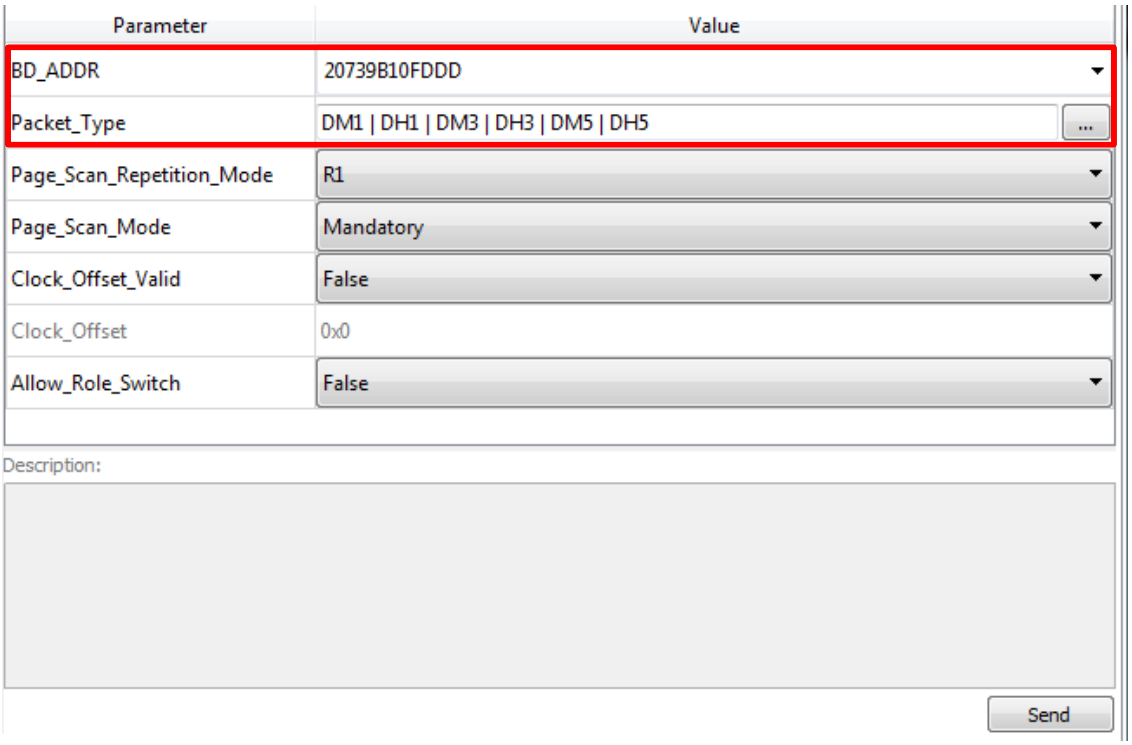
2.2 Create Connection with Device 2 (Master)

IMPORTANT: The BD_Address of the two devices CANNOT be the same.

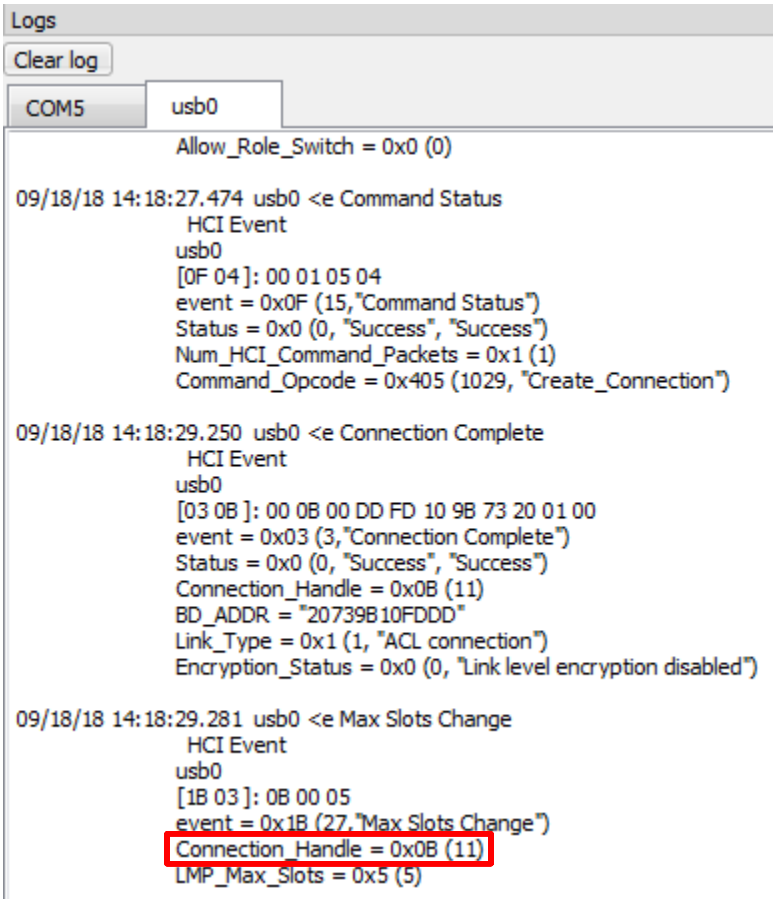
1. Click **Create_Connection** to open the settings menu on the right-hand side.



2. Make the following changes and click **Send**.
   - BD_ADDR: Use the drop-down menu to search for the BD_ADDR of the Slave device (Device 1) (Refer to Section 6.1→Step 11).
   - Packet_Type: Check the box for the following packet types: DM1, DM3, DM5, DH1, DH3, DH5. Leave other settings as default.



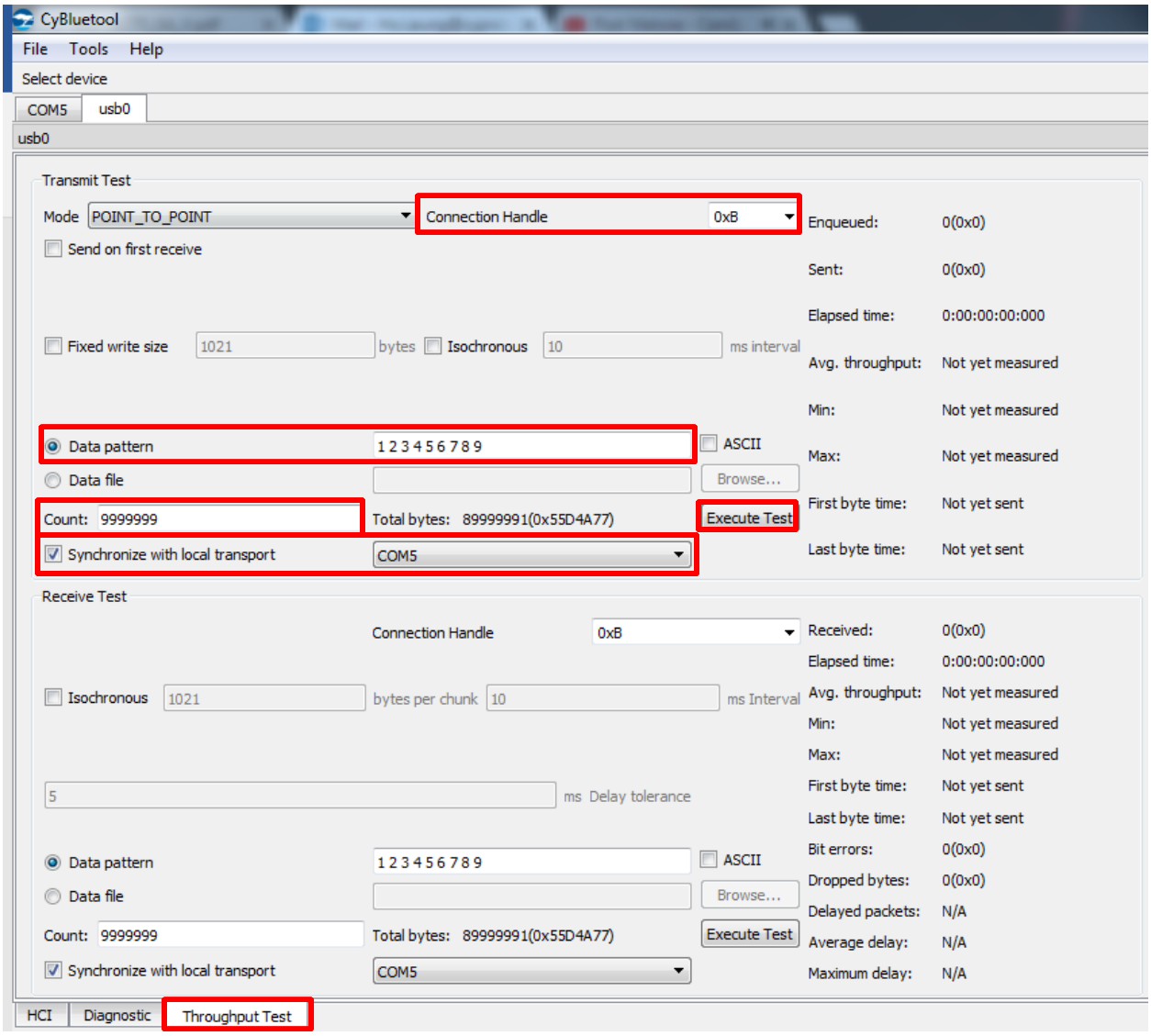
3. Check the Log window to verify if a Connection_Handle is created. If there is no Connection_Handle, the two devices failed to create a connection.



2.3 Throughout Test

1. Navigate to the **Throughput Test** tab on both devices and make the following changes:
   - Connection Handle: Verify that the Connection handle corresponds to the one in the Log window when creating connection.
   - Synchronize with local Transport: Check the box and select the COM port/USB port of the other device. When the device is synchronized, changes will appear on both device tabs.
   - Data pattern: Enter any data pattern desired (i.e., “1 2 3 4 5 6 7 8 9”).

     Note: A space between each numeric is required
   - Count: Enter desired times to repeat the data pattern transmission (i.e. “999999”).
2. Click **Execute Test** to begin throughput.

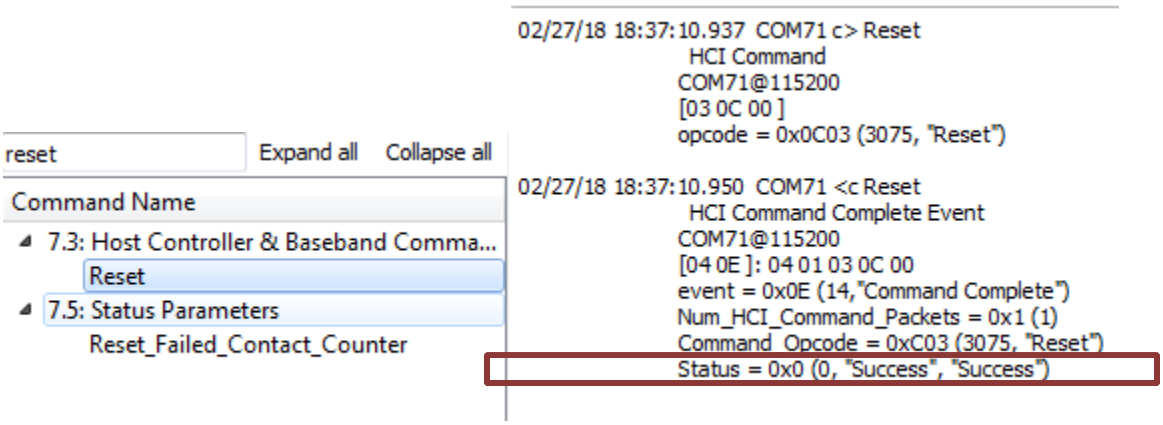


3. BLE Throughput Test

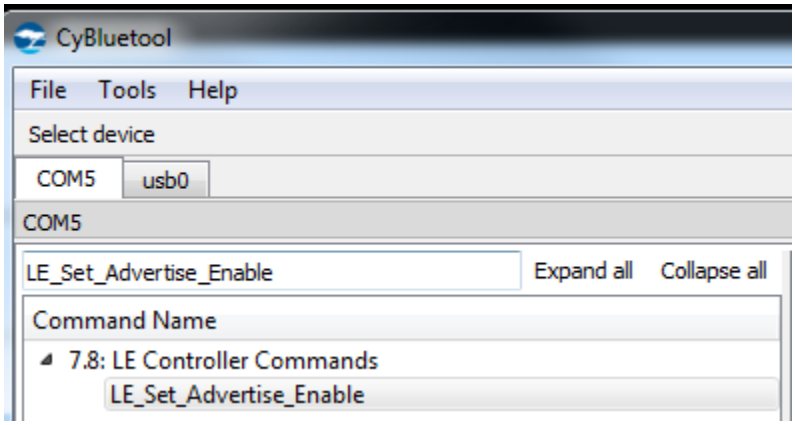
3.1 BLE Advertise Mode on Device 1 (Slave)

1. Double-click **Reset** to issue a device reset.

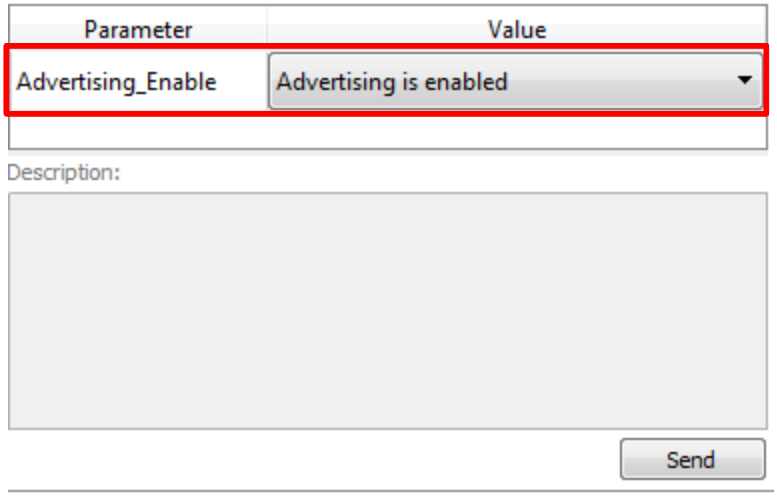
   Note: Device reset should always be performed at the beginning of device use.



2. Click on LE_Set_Advertise_Enable to open the settings menu on the right-hand side.

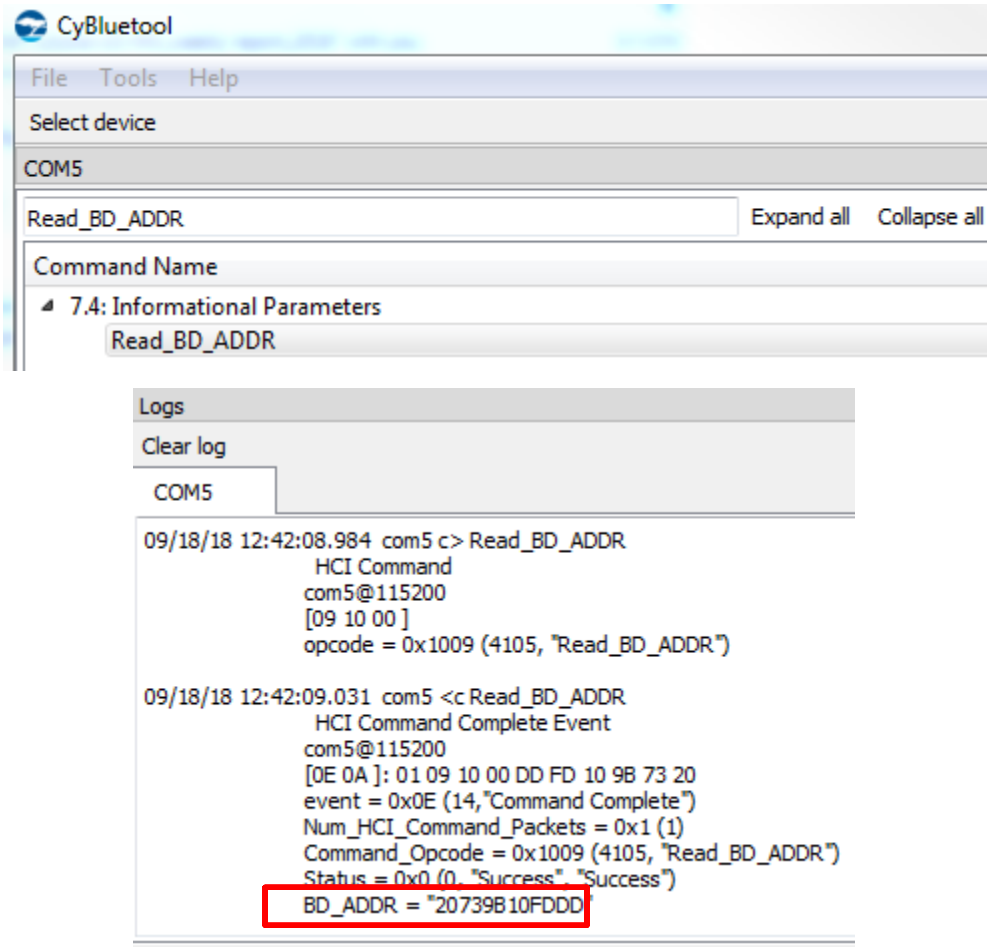


3. For the Advertising_Enable parameter, select **Advertising is enabled**" and click **Send**.



4. Double-click Read_BD_ADDR.

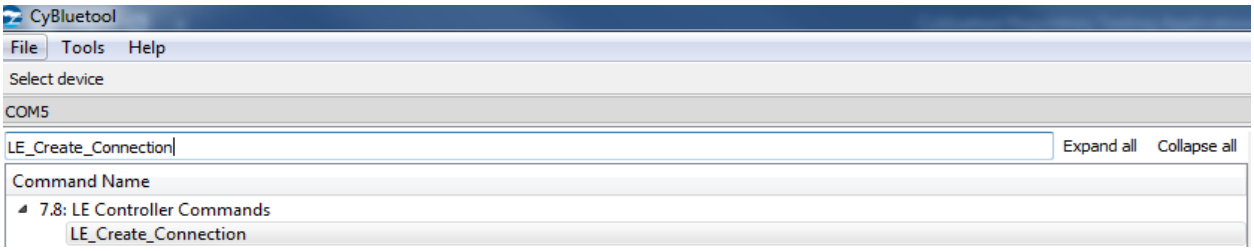
   The BD ADDR is required for the next part to create a connection.



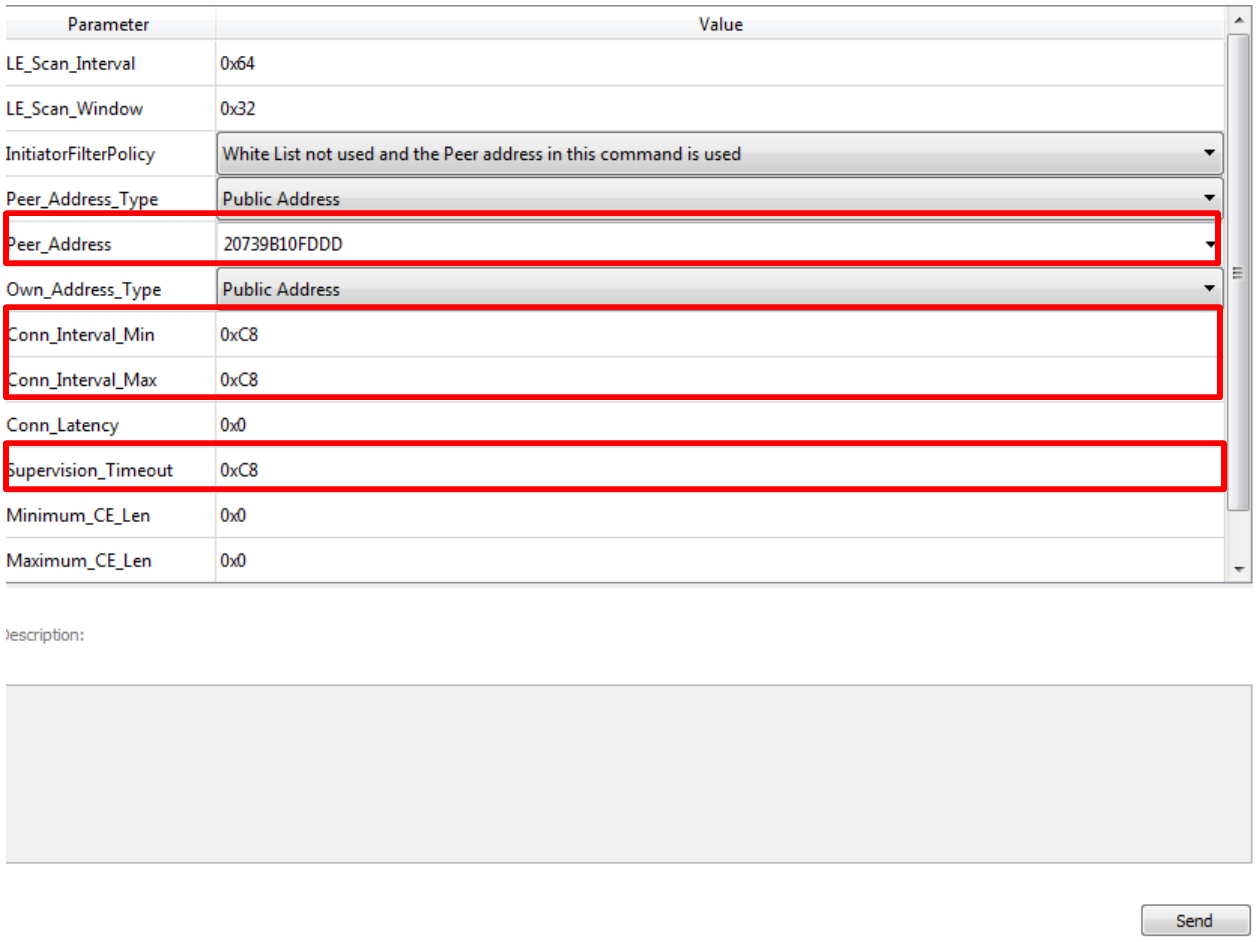
3.2 Create BLE Connection with Device 2 (Master)

IMPORTANT: The BD_Address of the two devices **CANNOT** be the same.

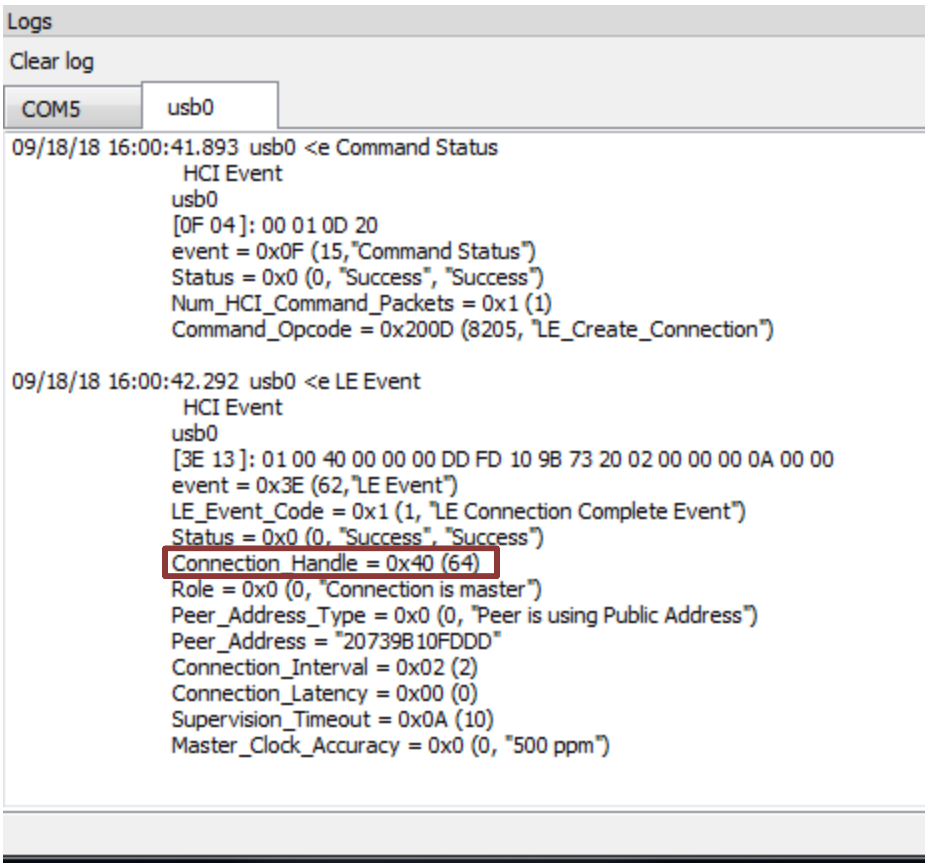
1. Click **LE_Create_Connection** to open the settings menu on the right-hand side.



2. For the **Peer_Address** parameter, select the BD_Addr of the Slave device.
3. Enter the desired same connection Interval for the following. Note that 8 slots (decimal value) equals 10 ms (i.e., input 1600 for 1 second).
   - Conn_Interval_Min
   - Conn_Interval_Max
   - Supervision_Timeout
4. Click **Send**.

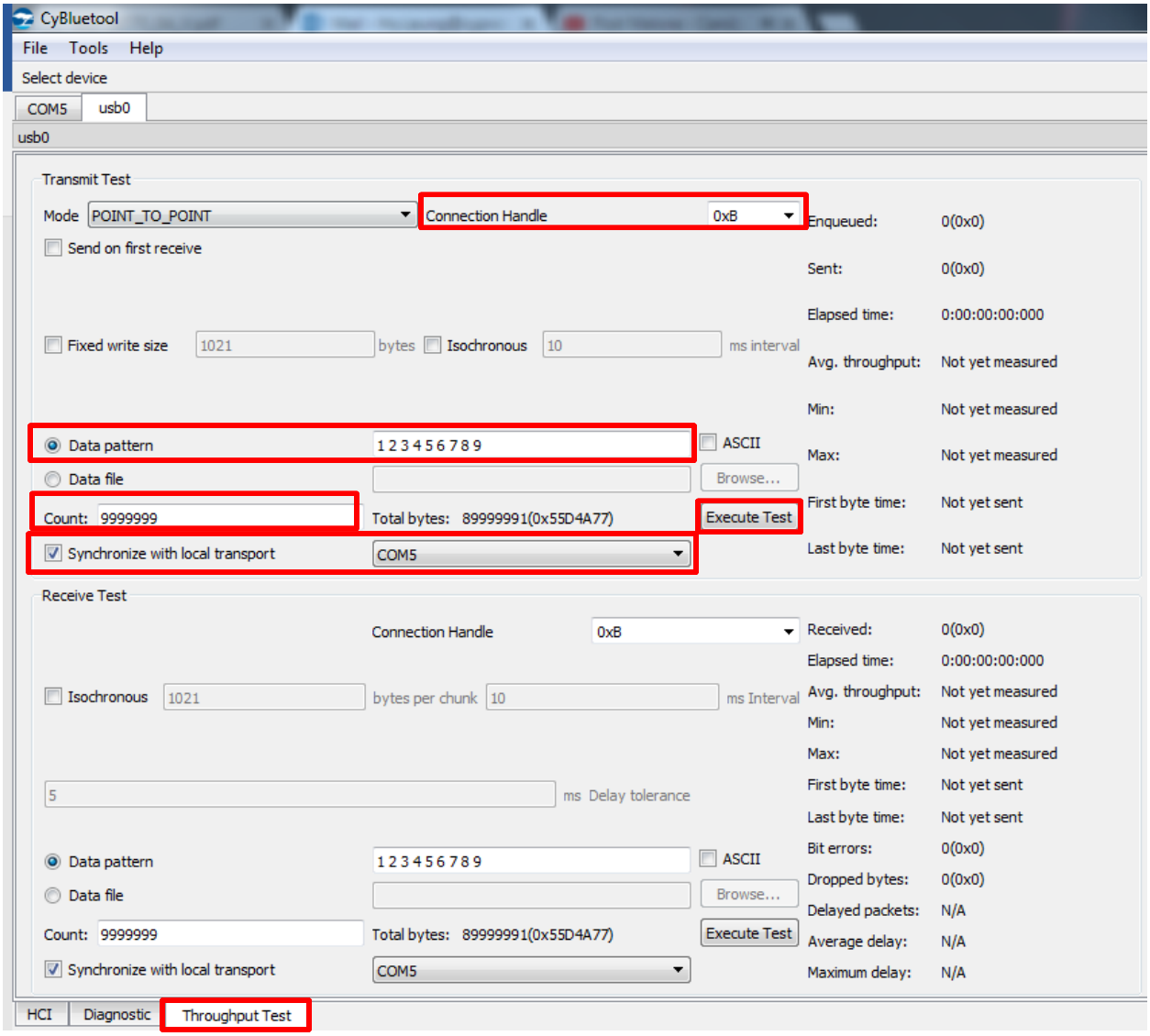


5. Check the Log window to verify if a Connection_Handle is created. If there is no Connection_Handle, the two devices failed to create a connection.



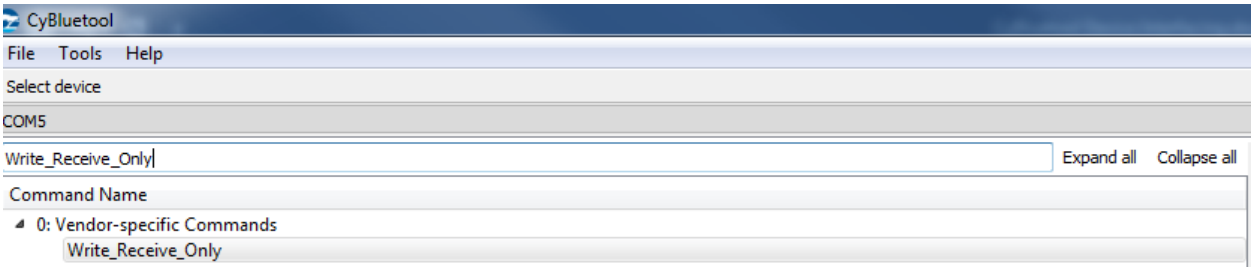
3.3 BLE Throughout Test

1. Navigate to the **Throughput Test** tab on both devices located above the Log window.
2. Make the following changes:
   - Connection Handle: Verify that the connection handle corresponds to the one found in the Log window when creating connection.
   - Synchronize with local Transport: Check the box and select the COM port/USB port of the other device. When the device is synchronized, changes will appear on both device tabs.
   - Data pattern: Enter any data pattern desired (i.e., “1 2 3 4 5 6 7 8 9”). Note that a space between each numeric is required.
   - Count: Enter desired times to repeat the data pattern transmission (i.e. “999999”).
3. Click **Execute Test** to begin the throughput test.

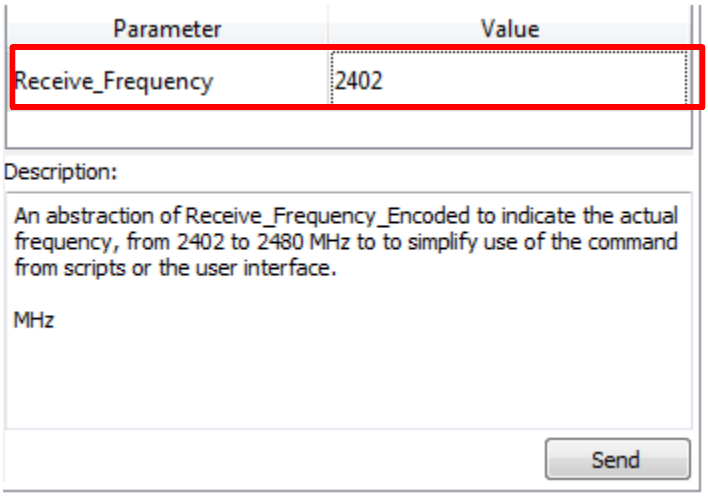

CyBluetool
File Tools Help
Select device
COM5 usb0
usb0
Transmit Test
Mode POINT_TO_POINT
Connection Handle 0xB
Send on first receive
Fixed write size 1021 bytes Isochronous 10 ms interval
Data pattern 123456789
ASCII
Data file
Browse...
Count: 9999999
Total bytes: 89999991(0x55D4A77)
Execute Test
Synchronize with local transport
COM5
Enqueued: 0(0x0)
Sent: 0(0x0)
Elapsed time: 0:00:00:00:000
Avg. throughput: Not yet measured
Min: Not yet measured
Max: Not yet measured
First byte time: Not yet sent
Last byte time: Not yet sent
Receive Test
Connection Handle 0xB
Isochronous 1021 bytes per chunk 10 ms Interval
5 ms Delay tolerance
Data pattern 123456789
ASCII
Data file
Browse...
Count: 9999999
Total bytes: 89999991(0x55D4A77)
Execute Test
Synchronize with local transport
COM5
Received: 0(0x0)
Elapsed time: 0:00:00:00:000
Avg. throughput: Not yet measured
Min: Not yet measured
Max: Not yet measured
First byte time: Not yet sent
Last byte time: Not yet sent
Bit errors: 0(0x0)
Dropped bytes: 0(0x0)
Delayed packets: N/A
Average delay: N/A
Maximum delay: N/A
HCI Diagnostic Throughput Test

4. BT Receiver Test

1. Click **Write_Receive_Only** to open the settings menu on the right-hand side.



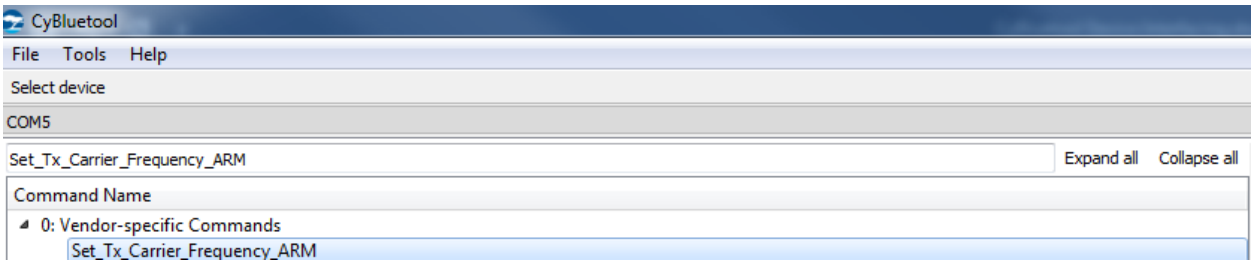
2. Receive_Frequency: Enter the desired frequency and click **Send**.
   - Low channel: 2402 MHz
   - Mid channel: 2441 MHz
   - High channel: 2480 MHz



5. BT Transmit Tests

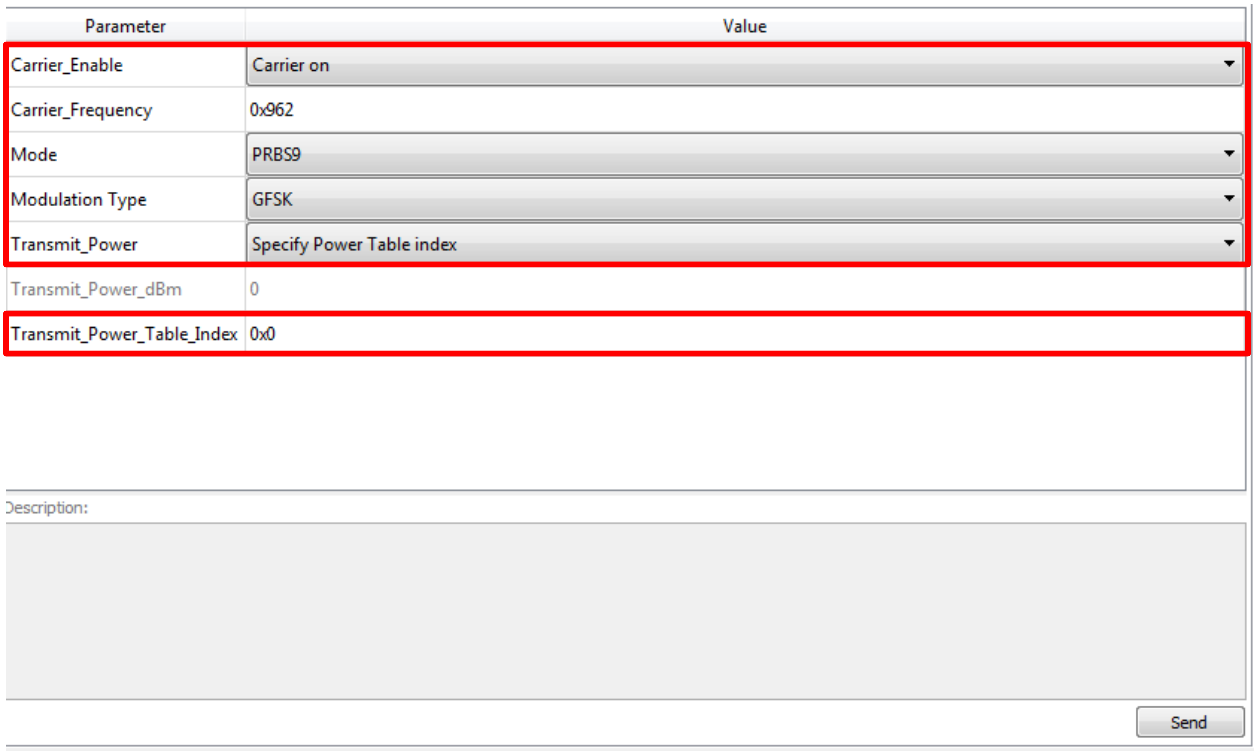
5.1 Single Frequency-No Hopping

1. Click **Set_Tx_Carrier_Frequency_ARM** to open the settings menu on the right-hand side.



2. Make the following changes and click **Send**.

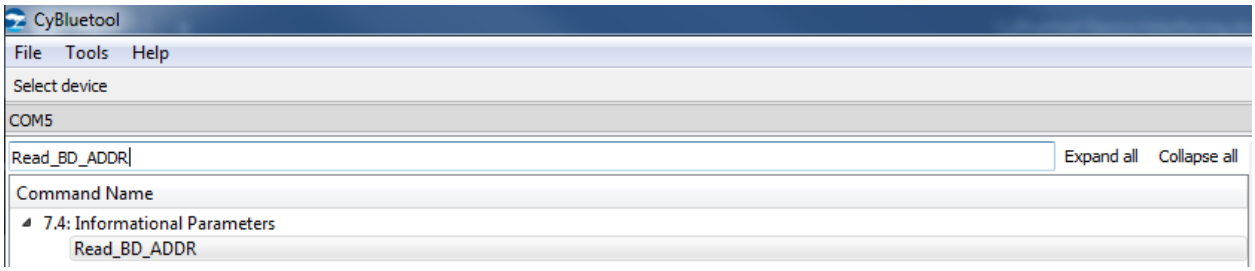
- Carrier_Enable: Select **Carrier on**.
- Carrier_Frequency: Enter the required frequency:
  - Low channel: 2402 MHz
  - Mid channel: 2441 MHz
  - High channel: 2480 MHz
- Mode: Select **PRBS9**.
- Modulation Type: Select the required modulation **GFSK**, **8PSK**, or **QPSK**.
- Transmit_Power: Select **Specify Power Table Index**.
- Transmit_Power_Table_Index: Enter ‘0’ to transmit at the maximum power step. Each power step will lower the output power by approximately 4 dB.



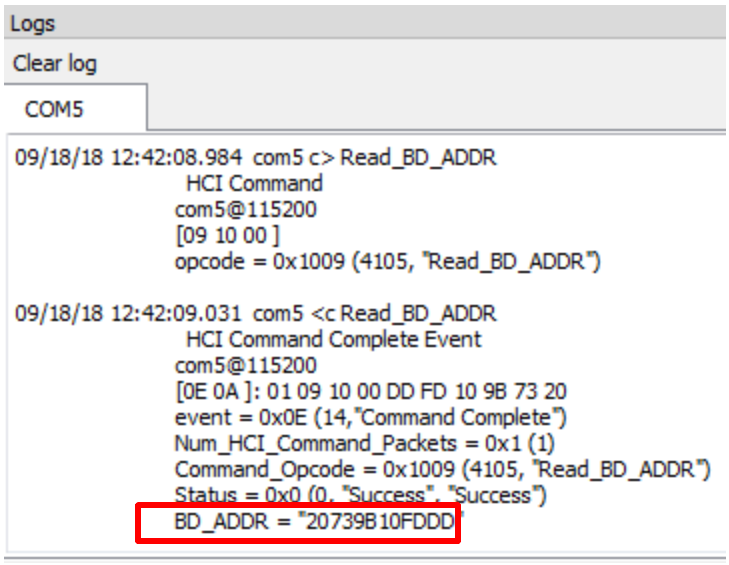
5.2 Frequency Hopping

5.2.1 ACL Basic (Basic Data Rate)

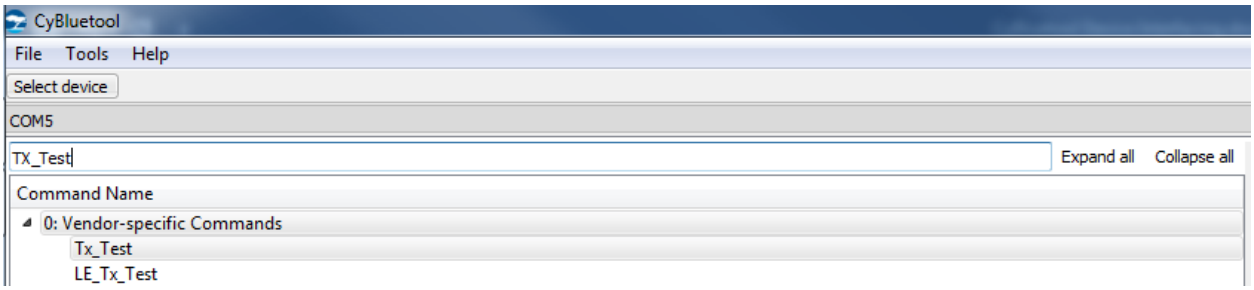
1. Double-click **Read_BD_ADDR**.



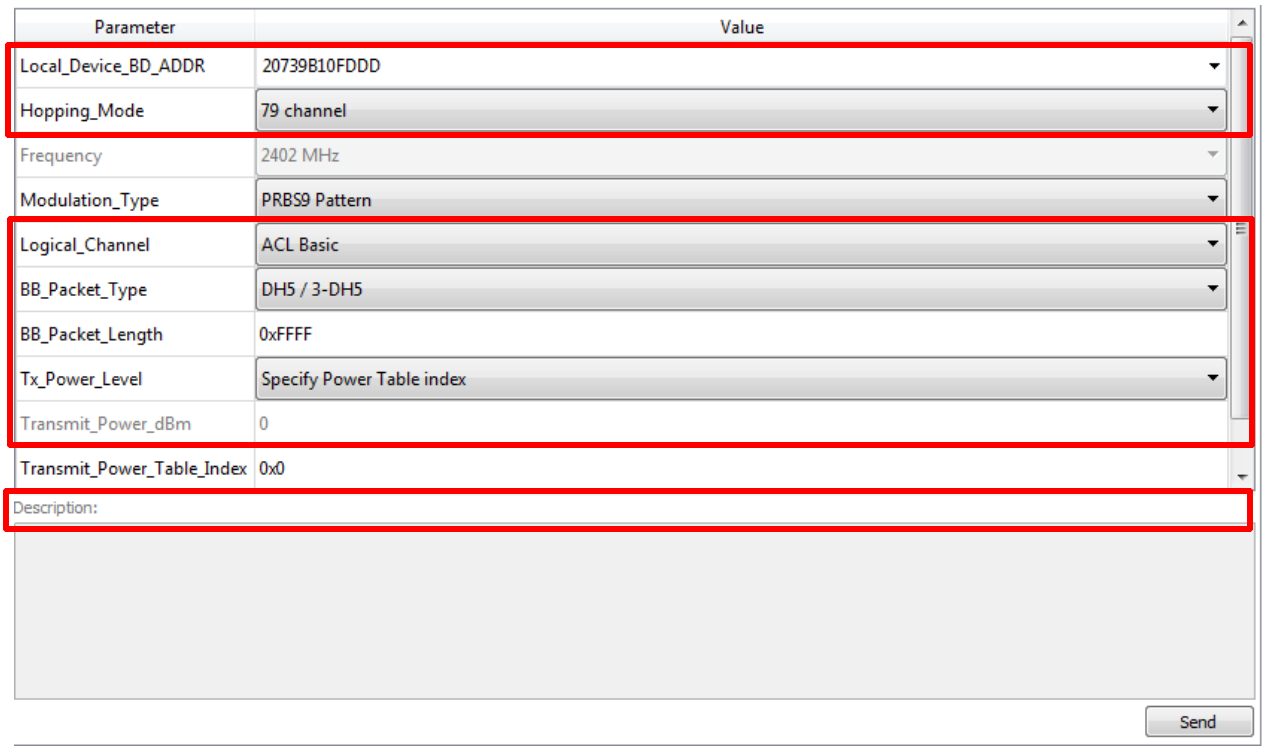
2. Locate BD_ADDR in the Log Window.



3. Click **TX_Test** to open the settings menu on the right-hand side.

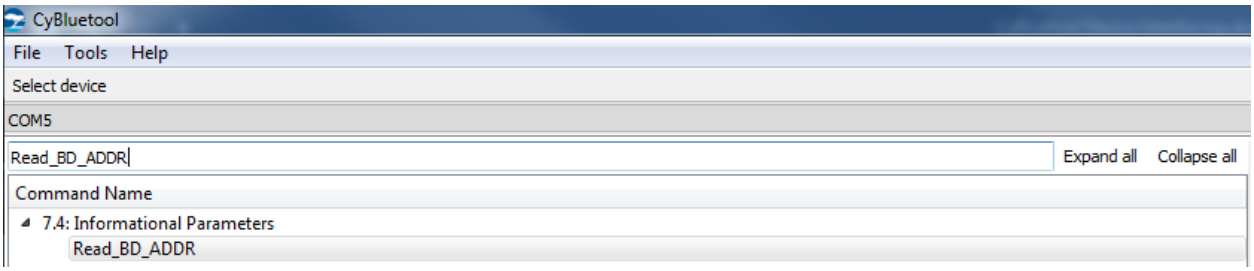


4. Make the following changes and click **Send**.
   - Local_Device_BD_ADDR: Enter the BD address found on Step 2.
   - Hopping_Mode: Select **79 Channel**.
   - Modulation_Type: Select **PRSBS9 Pattern**.
   - Logical_Channel: Select **ACL Basic** for Basic Data Rate modulation.
   - BB_Packet_Type: Select **DH5 / 3-DH5**.
   - BB_Packet_Length: Input **65535 (0xFFFF)** for maximum packet length.
   - Tx_Power_level: Select **Specify Power Table index**.
   - Transmit_Power_Tabel_Index: Enter **0**.

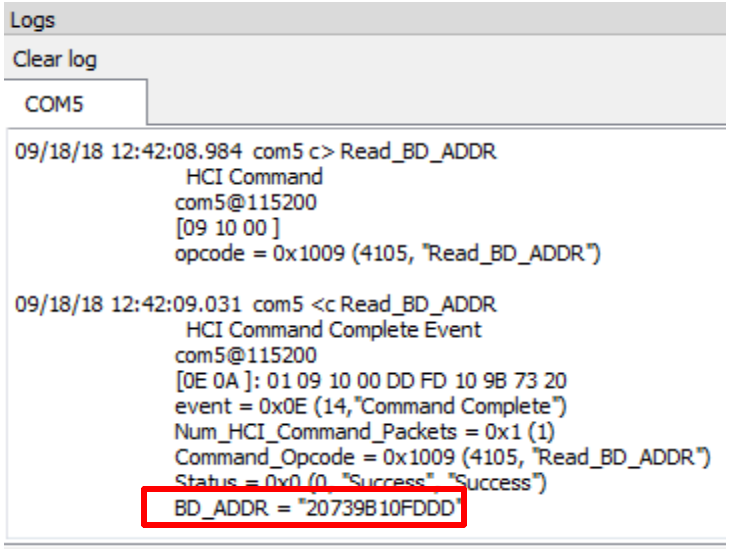


5.2.2 ACL EDR (Enhanced Data Rate – 2 Mbps and 3 Mbps)

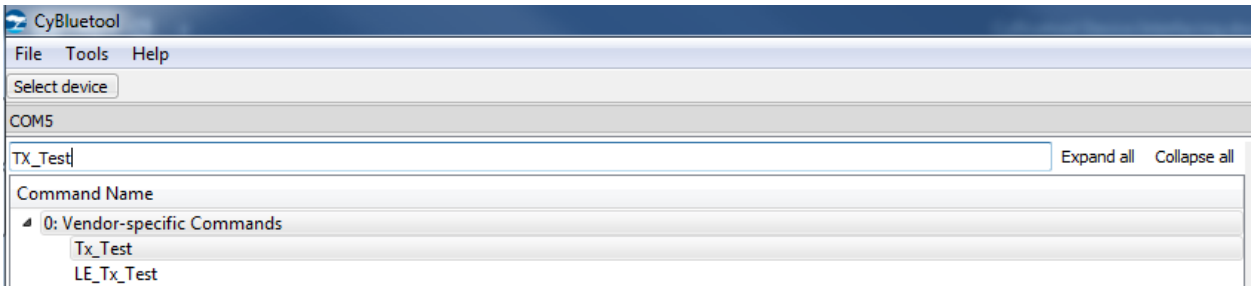
1. Double-click **Read_BD_ADDR**.



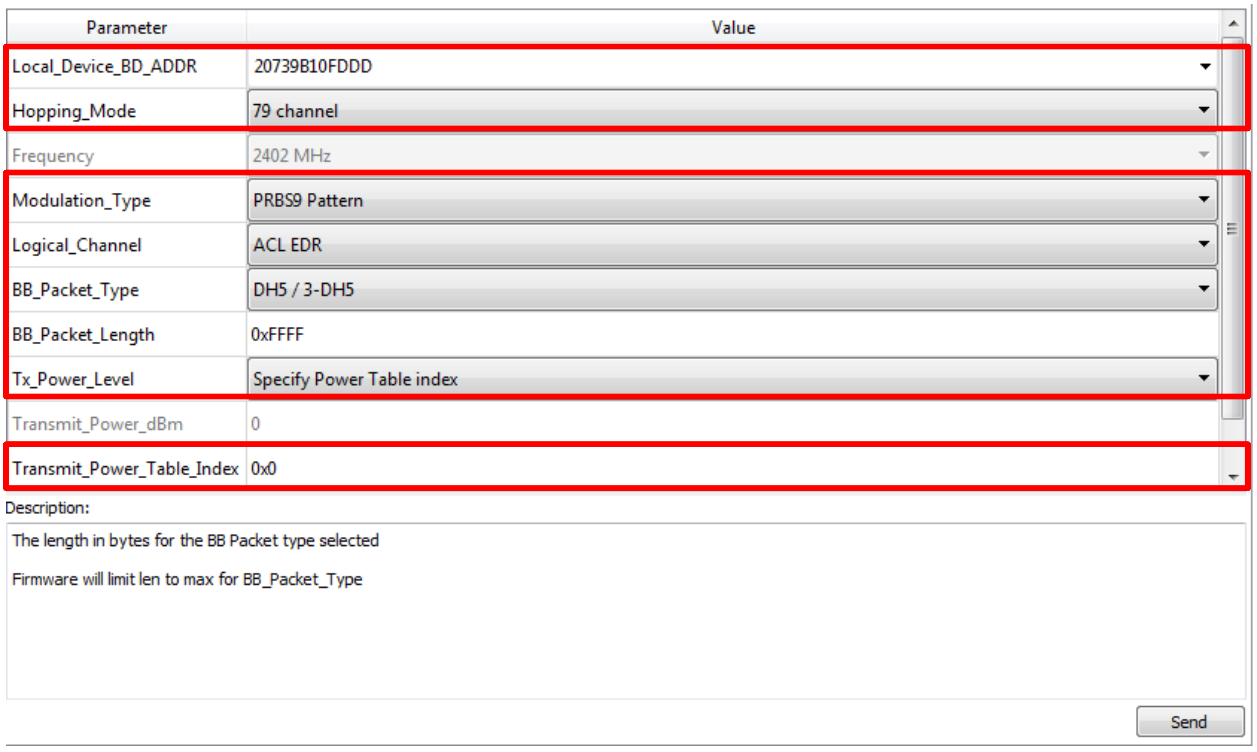
2. Locate **BD_ADDR** in the Log Window.



3. Click **TX_Test** to open the settings menu on the right-hand side.

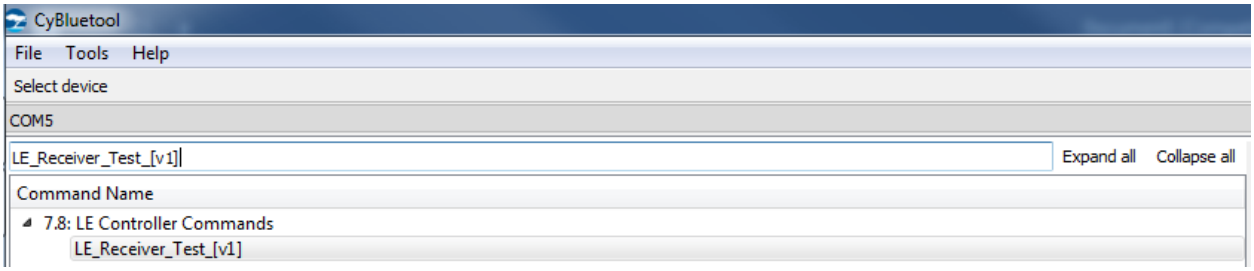


4. Make the following changes and click **Send**.
   - Local_Device_BD_ADD: Enter the BD address found in Step 1.
   - Hopping_Mode: Select **79 Channel**.
   - Modulation_Type: Select **PRSBS9 Pattern**.
   - Logical_Channel: Select **ACL EDR** for Enhanced Data Rate modulation.
   - BB_Packet_Type: Select the desired packet type:
     - 2-Mbps modulation: **DM5 / 2-DH5**.
     - 3-Mbps modulation: **DH5 / 3-DH5**.
   - BB_Packet_Length: Enter **65535 (0xFFFF)** for maximum packet length.
   - Tx_Power_level: Select **Specify Power Table index**.
   - Transmit_Power_Tabel_Index: Enter **0**.

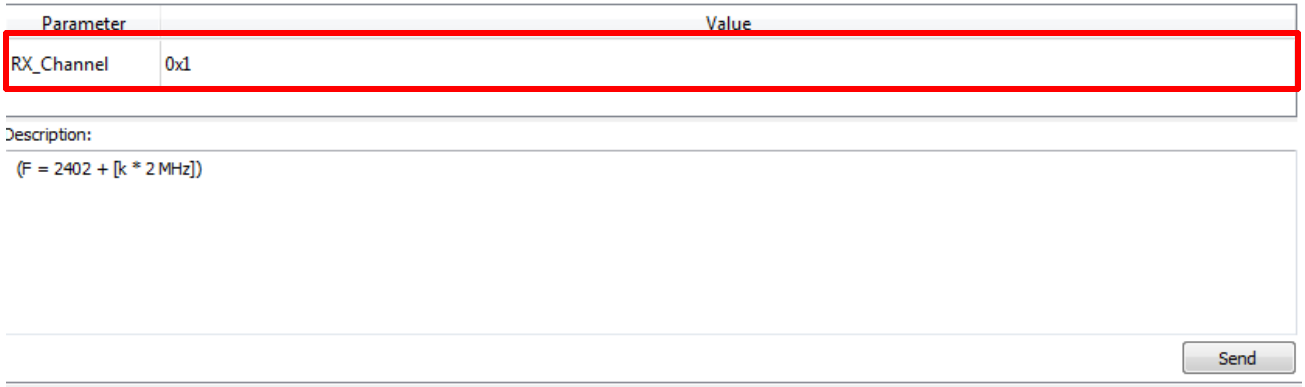


6. BLE Receiver Test

1. Click **LE_Receiver_Test_[v1]** to open the settings menu on the right-hand side.

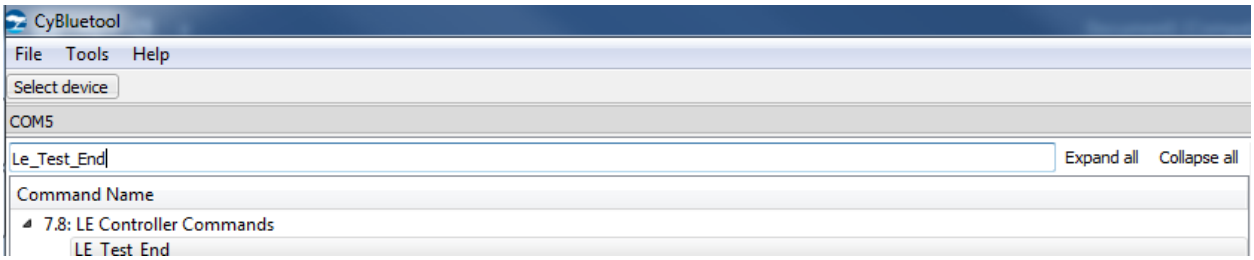


2. RX_Channel: Enter the desired frequency using the following equation and click **Send**.
   - F = 2402 MHz + [k * 2MHz]
     - Low channel: 1 → 2404 MHz
     - Mid channel: 21 → 2444 MHz
     - High channel: 38 →2478 MHz



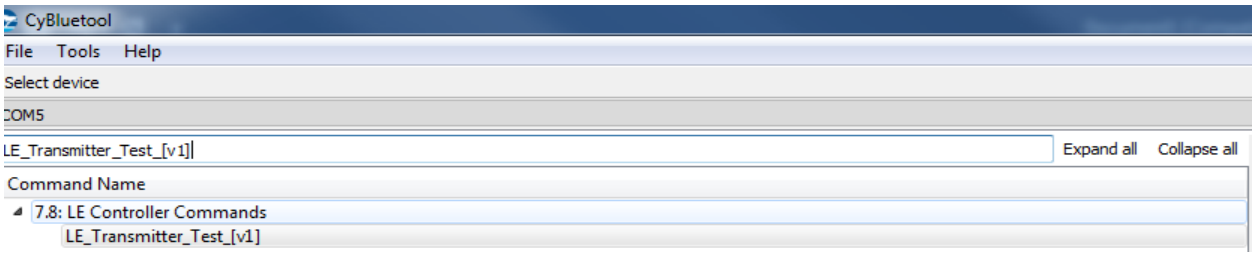
3. Double-click **LE_Test_End** to end the test.

Note: This command ends the current LE test and allows a new test to run.



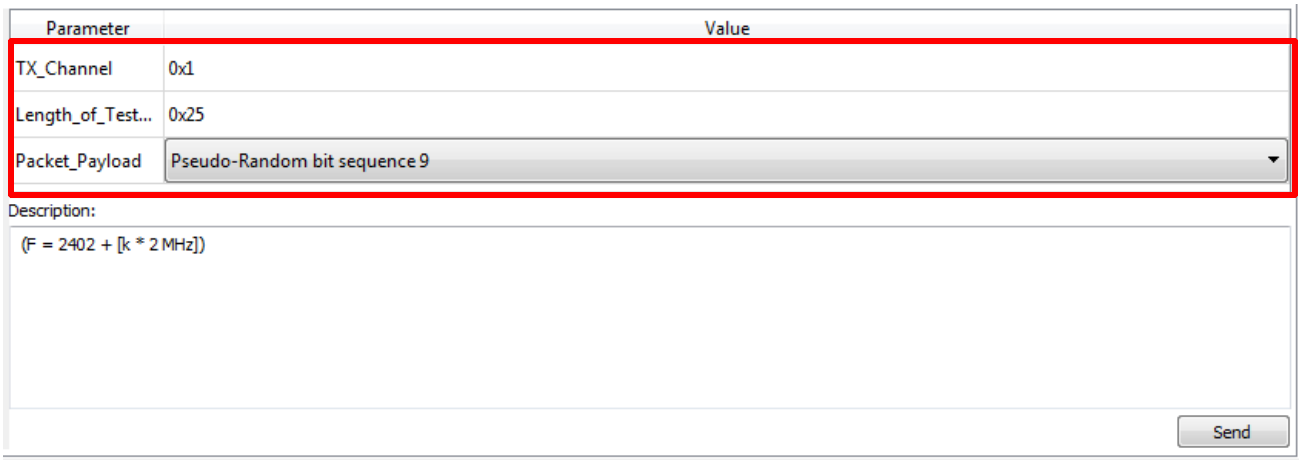
7. BLE Transmit Test – Single Frequency, No Hopping

1. Click **LE_Transmitter_Test_[v1]** to open the settings menu on the right-hand side.



2. Make the following changes and click **Send**.

- TX_Channel: Enter the desired frequency using the following equation:
- F = 2402MHz + [k * 2MHz].
  - Low channel: 1 → 2404 MHz
  - Mid channel: 21 → 2444 MHz
  - High channel: 38 →2478 MHz
- Length_of_Test_Data: Enter **37 (0x25)**.
- Packet_Payload: Select **Pseudo-Random bit sequence 9**.



3. Double-click **LE_Test_End** to end the test.

   This command ends the current LE test and allows a new test to run.


CyBluetool
File
Tools
Help
Select device
COM5
Le_Test_End
Expand all
Collapse all
Command Name
7.8: LE Controller Commands
LE_Test_End

Revision History

Document Title: CyBluetool User Guide Document Number: 002-25714			
Revision	**Issue Date**	**Origin of Change**	**Description of Change**
**	11/22/2018	HJLG	Initial release