



# CyBluetool User Guide

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# 1. Device Setup



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

## 1.1 Installation

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

### 1.1.1 Windows

#### 1.1.1.1 Installing CyBluetooth

1. Download the CyBluetooth 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 CyBluetooth to be installed and click **Next**.
3. Select the components to be installed. By default, both CYBTSP and CyBluetooth 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	<a href="http://samba.aus.cypress.com/projects/blueth_release/BroadcomInternal/BLUETOOL/ActivePerl-5.8.4.810-MSWin32-x86.msi">\\samba.aus.cypress.com\projects\blueth_release\BroadcomInternal\BLUETOOL\ActivePerl-5.8.4.810-MSWin32-x86.msi</a> or <a href="http://iot-webserver.aus.cypress.com/projects/blueth_release/BroadcomInternal/BLUETOOL/ActivePerl-5.8.4.810-MSWin32-x86.msi">http://iot-webserver.aus.cypress.com/projects/blueth_release/BroadcomInternal/BLUETOOL/ActivePerl-5.8.4.810-MSWin32-x86.msi</a>
Visual C++ Redistributable for Visual Studio 2015	<a href="https://www.microsoft.com/en-us/download/details.aspx?id=48145">https://www.microsoft.com/en-us/download/details.aspx?id=48145</a>

2. Copy the contents of the *cybtsp* folder in the CyBluetooth 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-continuous-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
```

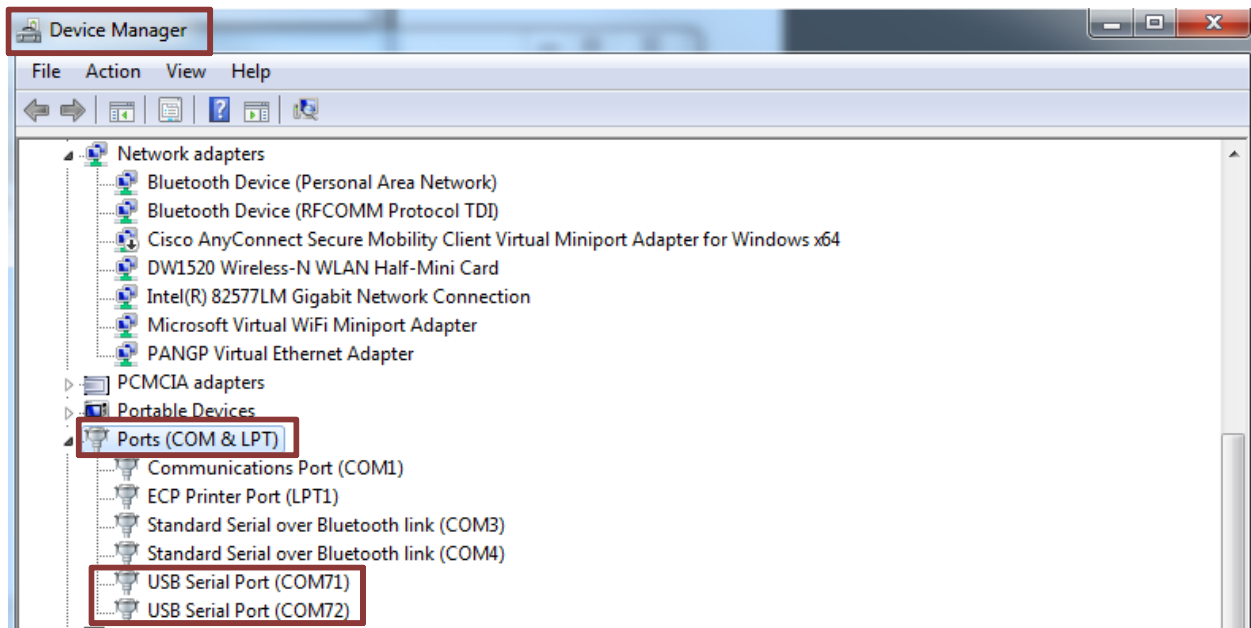
4. Execute the following script to install the driver:

**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).



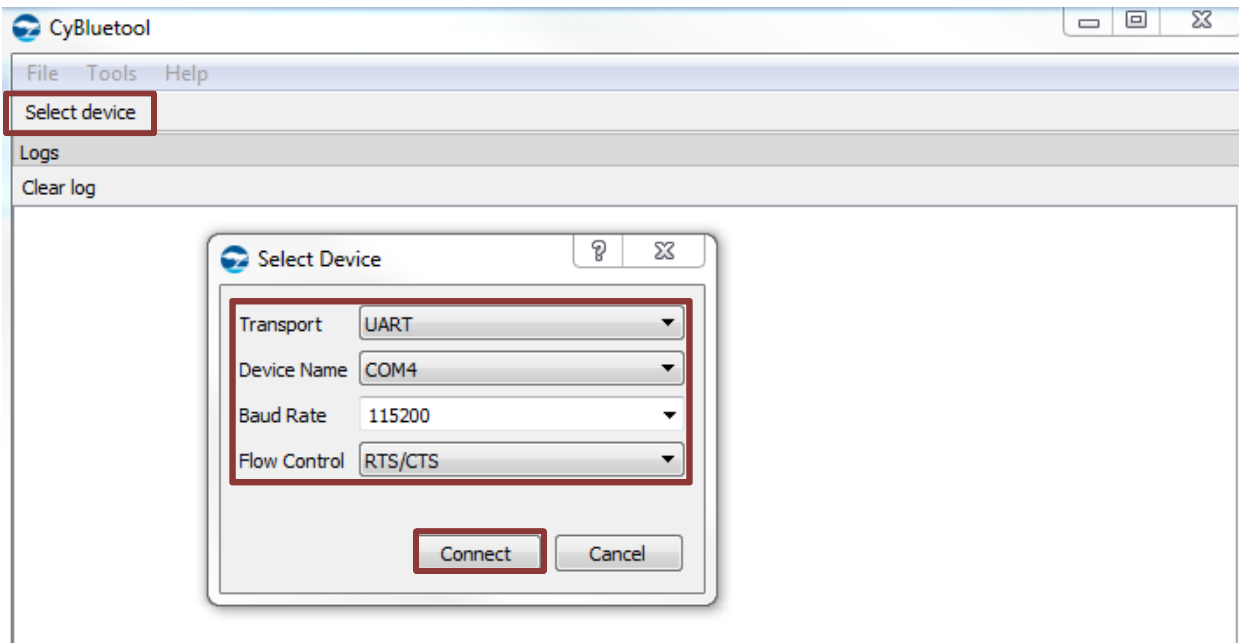
## 1.3 USB Connections

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

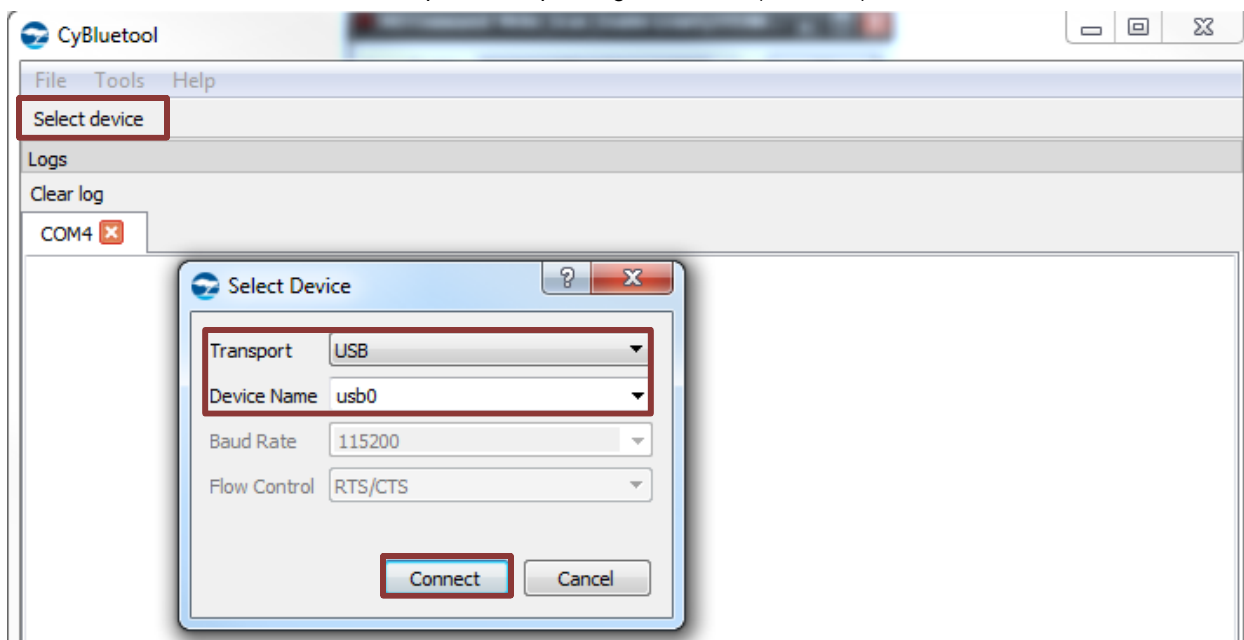
### 1.4.1 UART Interface

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).

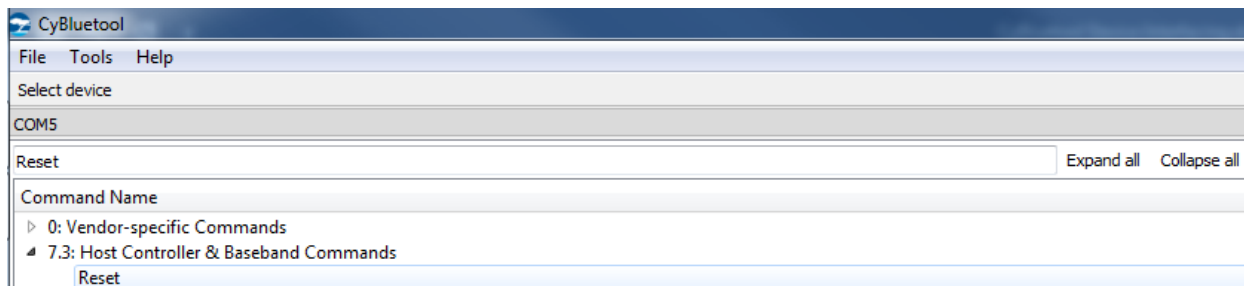


## 1.5 Reset the Device Under Test

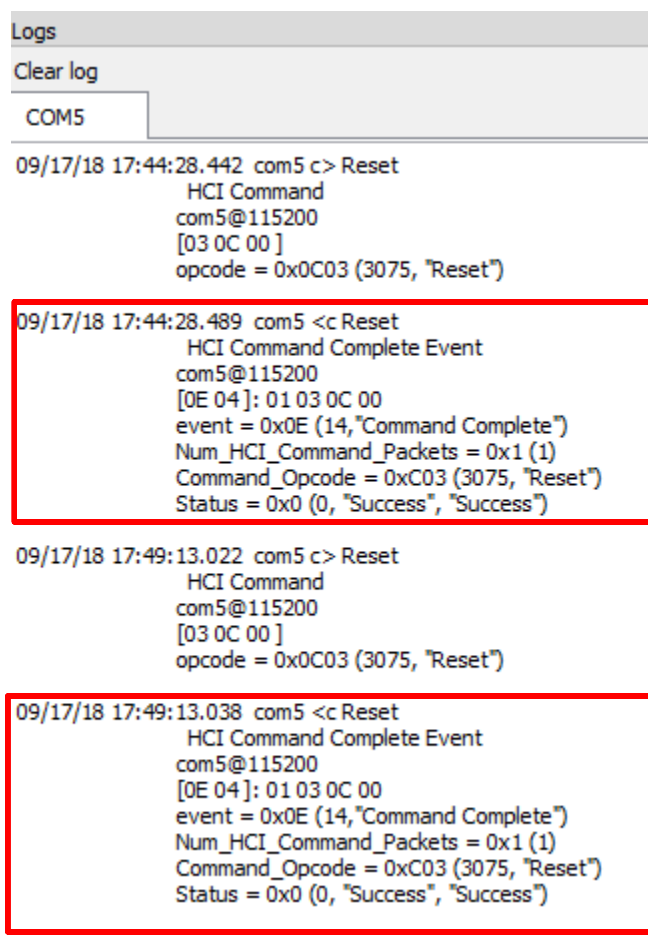
**Note:** The Device Under Test (DUT) should be reset before each procedure.

**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.





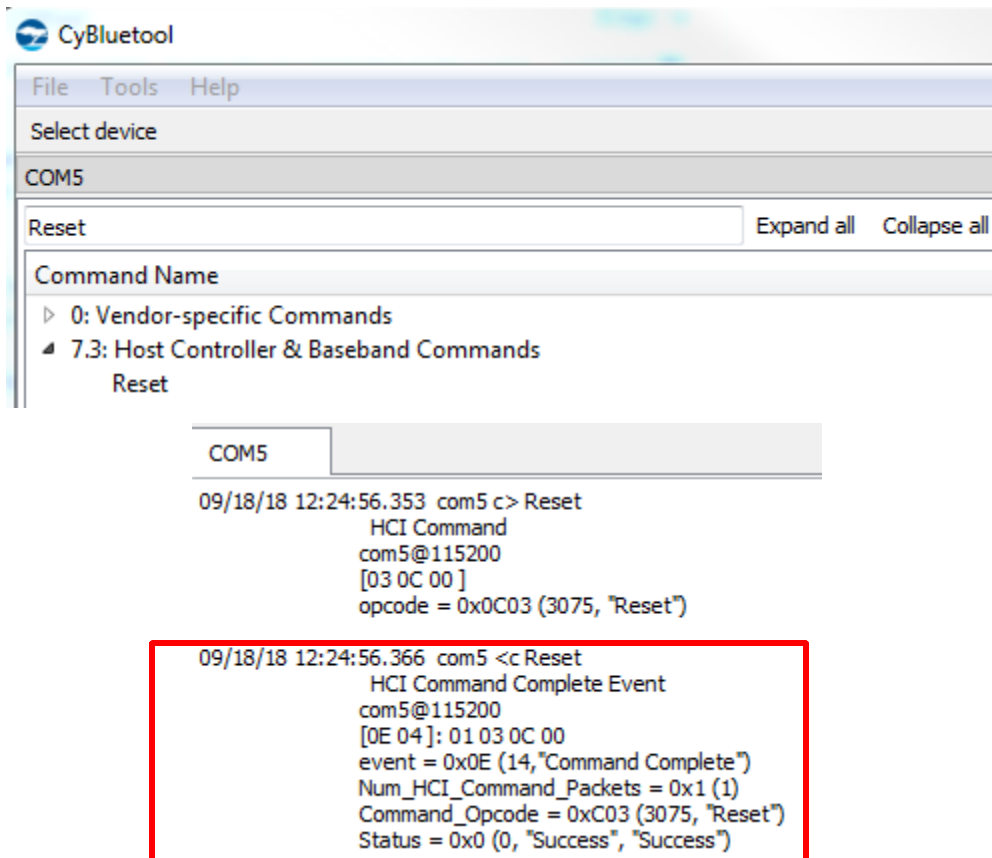
## 1.6 Downloading Firmware

### 1.6.1 CYW920719 Firmware Download Requirements (Autobaud Mode)

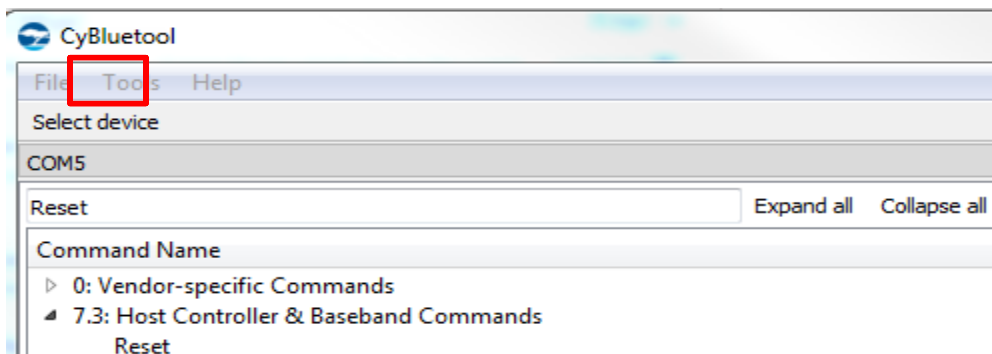
To download firmware on CYW920719 chips, auto-baud mode is required. When CTS is low, **release reset** to enable auto-baud mode.

### 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.

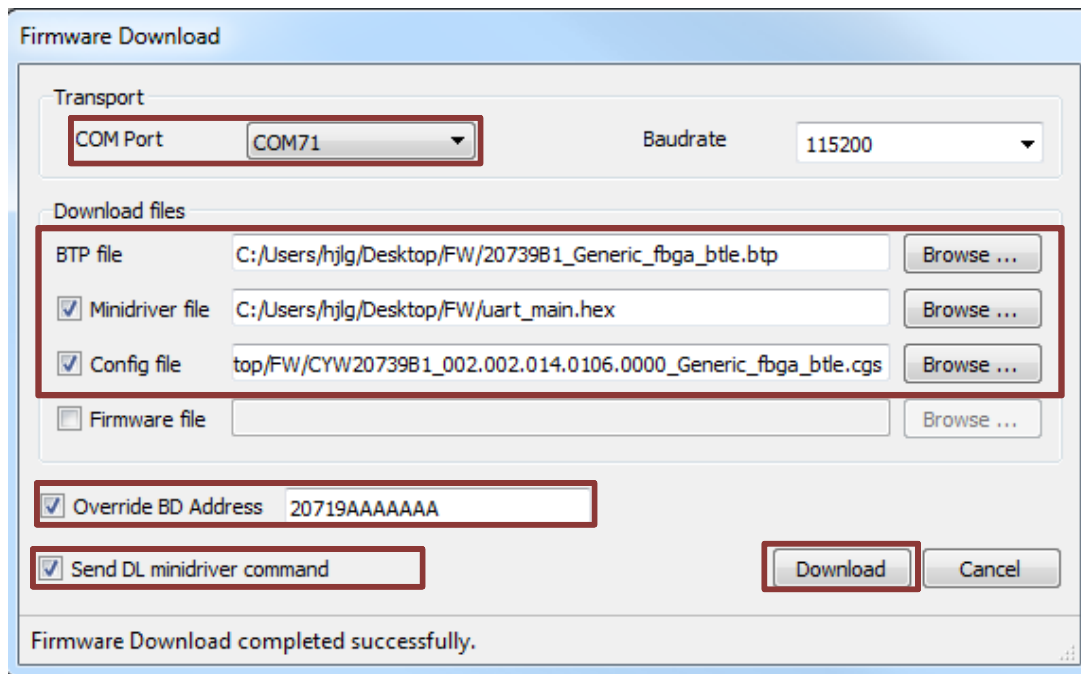


2. On the top left corner of CyBluetooth, click **Tools > Firmware Download**.



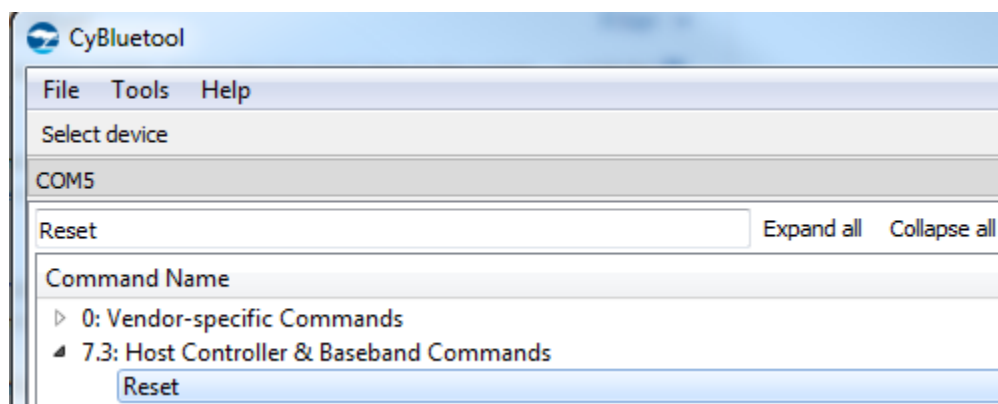
3. On the Firmware Download dialog, set the following:
  - Com Port: Select the COM port for your device (Refer to Section 2.1).
  - BTP File: Load the provided .btp extension file.

- 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".

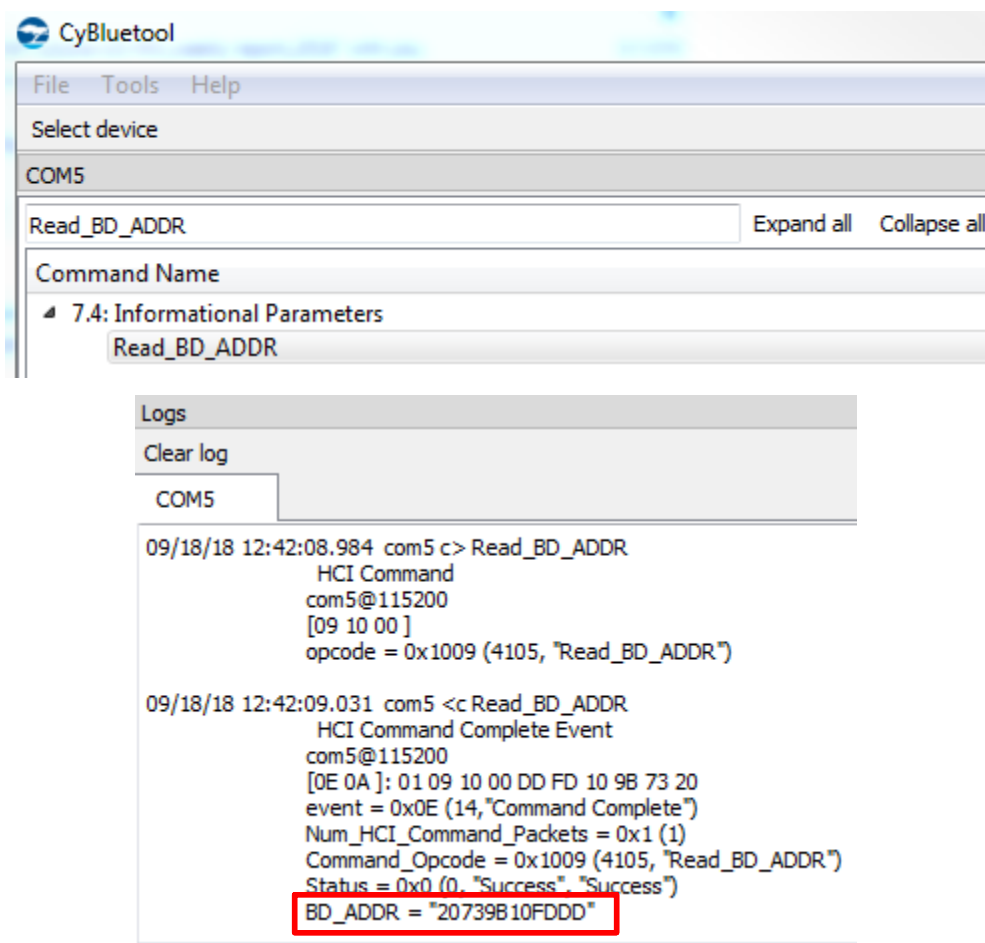


```

Logs
Clear log
COM5
09/18/18 12:40:39.995 com5 c> Reset
    HCI Command
    com5@115200
    [03 0C 00 ]
    opcode = 0x0C03 (3075, "Reset")

09/18/18 12:40:40.011 com5 <c Reset
    HCI Command Complete Event
    com5@115200
    [0E 04 ]: 01 03 0C 00
    event = 0x0E (14, "Command Complete")
    Num_HCI_Command_Packets = 0x1 (1)
    Command_Opcode = 0xC03 (3075, "Reset")
    Status = 0x0 (0, "Success", "Success")
  
```

- Double-click **Read\_BD\_ADDR**.



The screenshot shows the CyBlue tool interface. The 'Command Name' list is expanded to '7.4: Informational Parameters', and 'Read\_BD\_ADDR' is selected. Below this, the 'Logs' window shows the command execution details for 'Read\_BD\_ADDR'.

```

CyBlue tool
File Tools Help
Select device
COM5
Read_BD_ADDR Expand all Collapse all
Command Name
7.4: Informational Parameters
Read_BD_ADDR

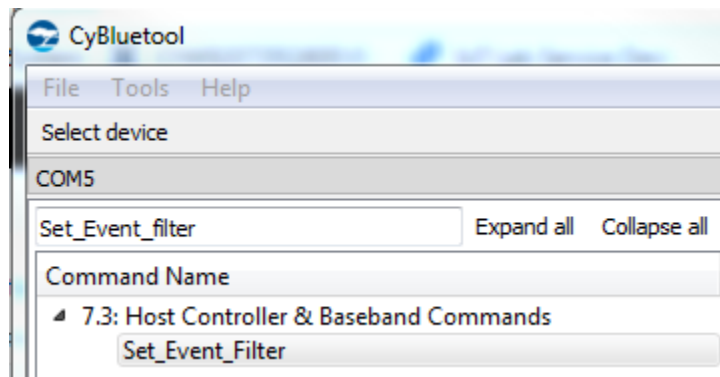
Logs
Clear log
COM5
09/18/18 12:42:08.984 com5 c> Read_BD_ADDR
    HCI Command
    com5@115200
    [09 10 00 ]
    opcode = 0x1009 (4105, "Read_BD_ADDR")

09/18/18 12:42:09.031 com5 <c Read_BD_ADDR
    HCI Command Complete Event
    com5@115200
    [0E 0A ]: 01 09 10 00 DD FD 10 9B 73 20
    event = 0x0E (14, "Command Complete")
    Num_HCI_Command_Packets = 0x1 (1)
    Command_Opcode = 0x1009 (4105, "Read_BD_ADDR")
    Status = 0x0 (0, "Success", "Success")
    BD_ADDR = "20739B10FDDD"
  
```

- 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.



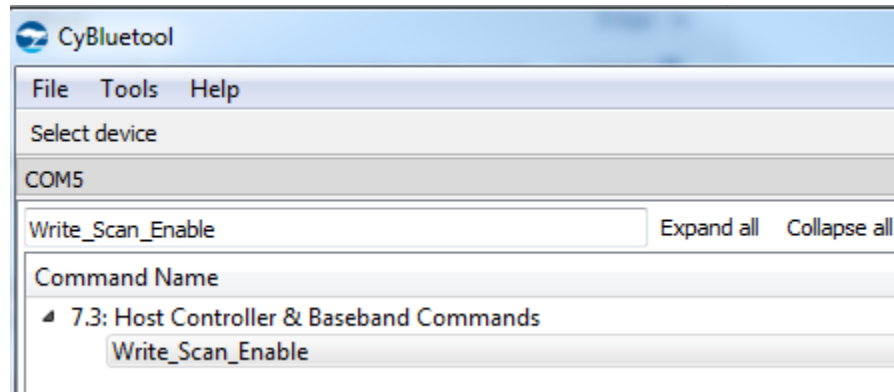
2. Make the following changes and click **Send**:

- 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**.

Parameter	Value
Filter_Type	Connection Setup ▼
Connection_Setup_Filter_Condition_Type	Allow Connections from all devices ▼
Auto_Accept_Flag	Do Auto accept the connection with role switch disable ▼

Description:

3. Click **Write\_Scan\_Enable** to open the settings menu on the right-hand side.

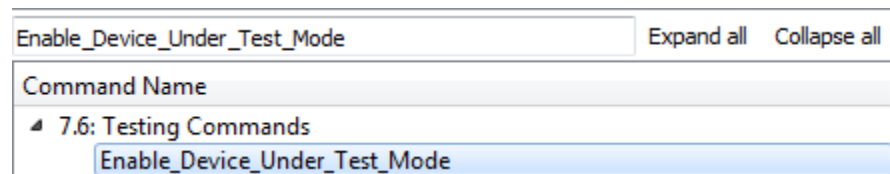


4. For the Scan\_Enable parameter, select **Inquiry and Page Scan Enabled** and click **Send**.

Parameter	Value
Scan_Enable	Inquiry and Page Scan enabled ▼

Description:

5. Double-click **Enable\_Device\_under\_test\_mode** to issue the command.



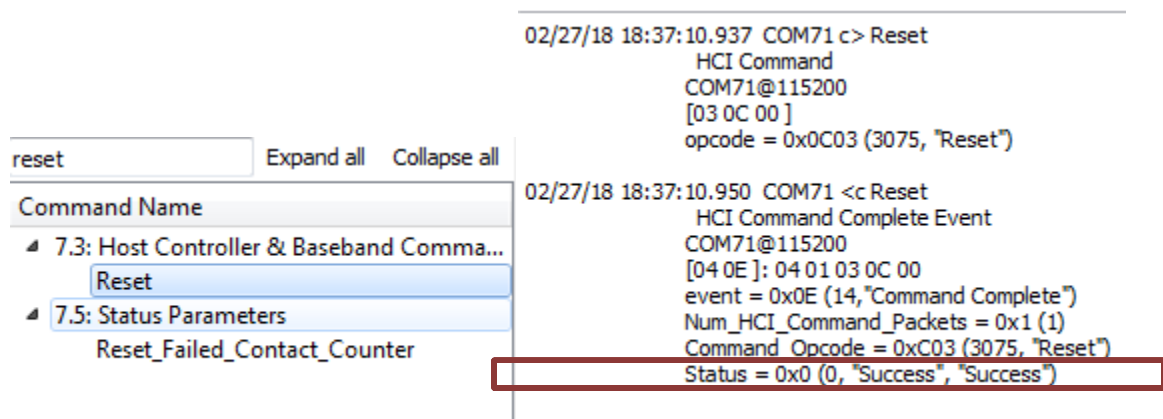
## 2. BT Throughput Test



### 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.

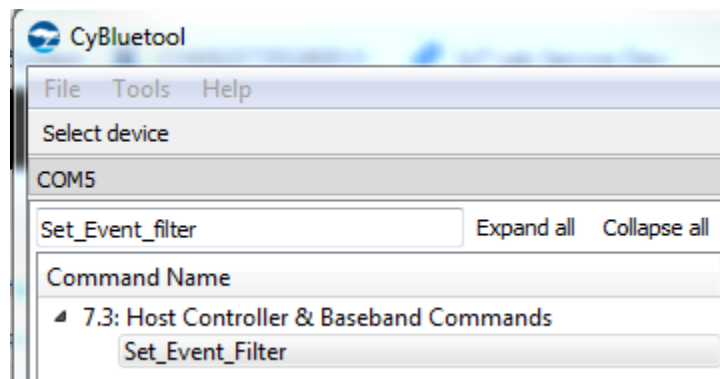


The screenshot shows the CyBlue tool interface. On the left, a tree view under 'Command Name' has '7.3: Host Controller & Baseband Commands' expanded, and 'Reset' is selected. On the right, the log shows the following sequence of events:

```
02/27/18 18:37:10.937 COM71 c> Reset
HCI Command
COM71@115200
[03 0C 00 ]
opcode = 0x0C03 (3075, "Reset")

02/27/18 18:37:10.950 COM71 <c Reset
HCI Command Complete Event
COM71@115200
[04 0E ]: 04 01 03 0C 00
event = 0x0E (14, "Command Complete")
Num_HCI_Command_Packets = 0x1 (1)
Command Opcode = 0xC03 (3075, "Reset")
Status = 0x0 (0, "Success", "Success")
```

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**.

Parameter	Value
Filter_Type	Connection Setup ▼
Connection_Setup_Filter_Condition_Type	Allow Connections from all devices ▼
Auto_Accept_Flag	Do Auto accept the connection with role switch disable ▼

Description:

4. Click **Write\_Scan\_Enable** to open the settings menu on the right-hand side.

COM5

write\_scan\_enable

Expand all Collapse all

Command Name

7.3: Host Controller & Baseband Commands

Write\_Scan\_Enable

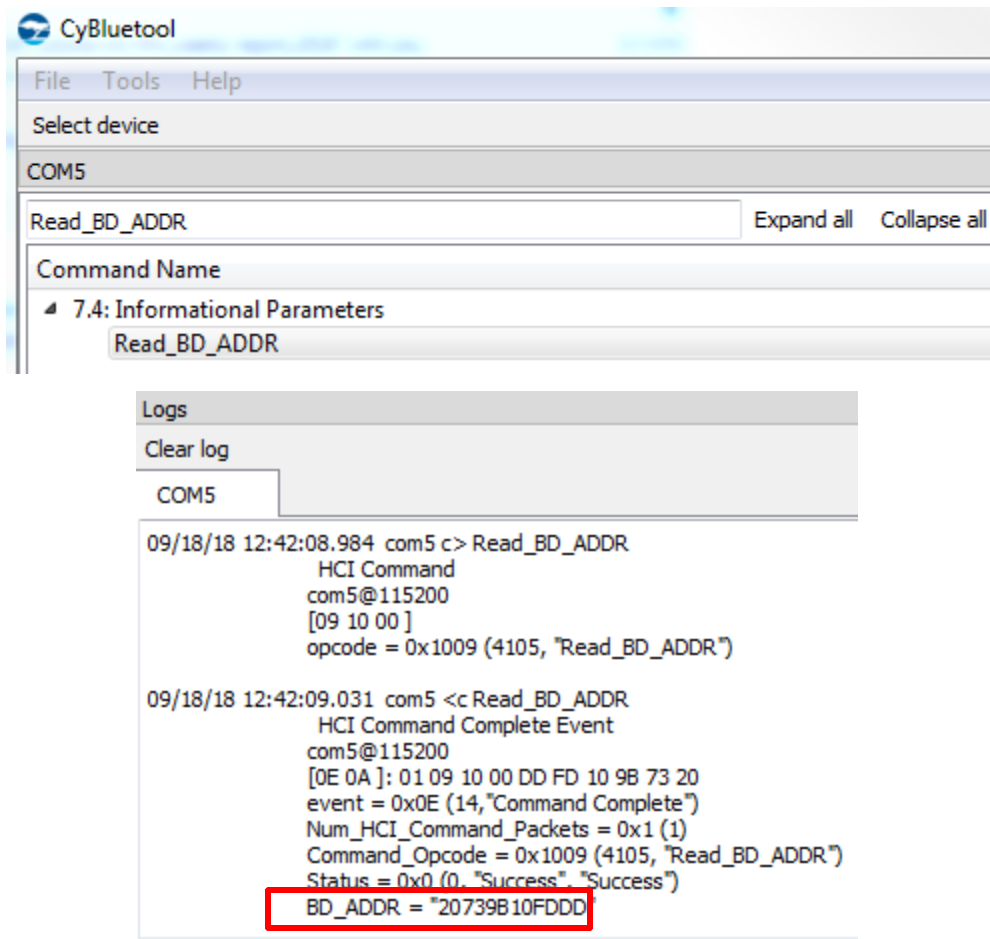
5. For the Scan\_Enable parameter, select **Inquiry and Page Scan Enabled** and click **Send**.

Parameter	Value
Scan_Enable	Inquiry and Page Scan enabled ▼

Description:

6. Double-click **Read\_BD\_ADDR**.

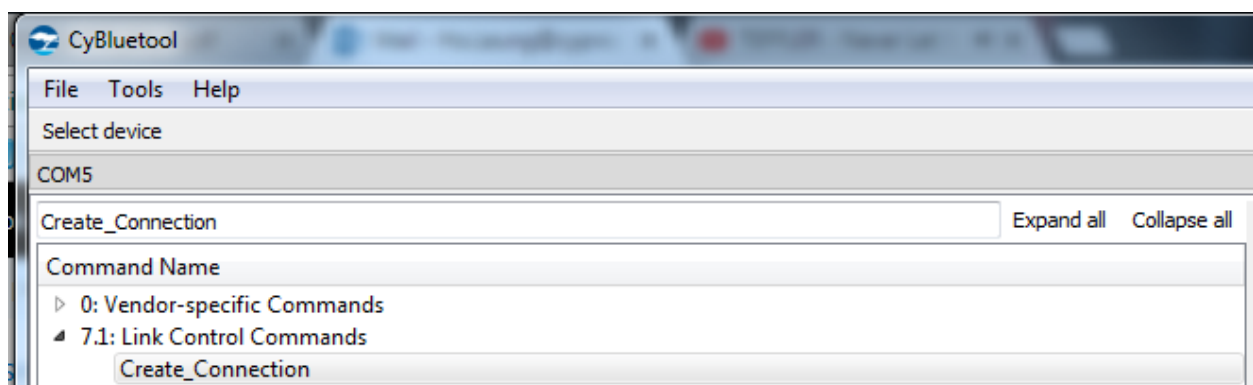
The BD ADDR is required for the next part to create a connection.



## 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.



Parameter	Value
BD_ADDR	20739B10FDDD
Packet_Type	DM1   DH1   DM3   DH3   DM5   DH5
Page_Scan_Repetition_Mode	R1
Page_Scan_Mode	Mandatory
Clock_Offset_Valid	False
Clock_Offset	0x0
Allow_Role_Switch	False

Description:

- 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.

**Logs**

**COM5** | **usb0**

```

Allow_Role_Switch = 0x0 (0)

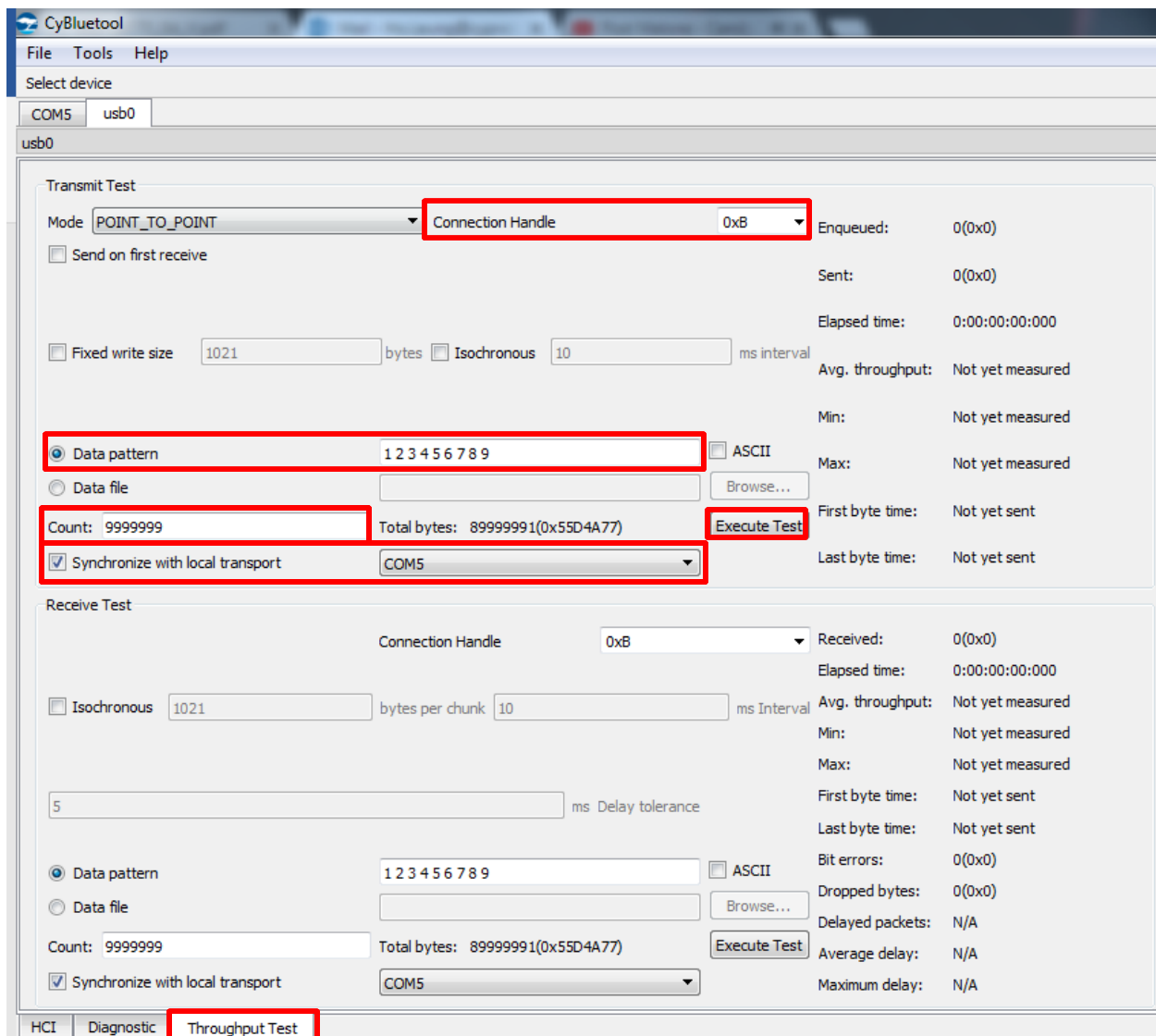
09/18/18 14:18:27.474 usb0 <e Command Status
  HCI Event
  usb0
  [0F 04]: 00 01 05 04
  event = 0x0F (15, "Command Status")
  Status = 0x0 (0, "Success", "Success")
  Num_HCI_Command_Packets = 0x1 (1)
  Command_Opcode = 0x405 (1029, "Create_Connection")

09/18/18 14:18:29.250 usb0 <e Connection Complete
  HCI Event
  usb0
  [03 0B]: 00 0B 00 DD FD 10 9B 73 20 01 00
  event = 0x03 (3, "Connection Complete")
  Status = 0x0 (0, "Success", "Success")
  Connection_Handle = 0x0B (11)
  BD_ADDR = "20739B10FDDD"
  Link_Type = 0x1 (1, "ACL connection")
  Encryption_Status = 0x0 (0, "Link level encryption disabled")

09/18/18 14:18:29.281 usb0 <e Max Slots Change
  HCI Event
  usb0
  [1B 03]: 0B 00 05
  event = 0x1B (27, "Max Slots Change")
  Connection_Handle = 0x0B (11)
  LMP_Max_Slots = 0x5 (5)
          
```

## 2.3 Throughout Test

- Navigate to the **Throughout 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").
- Click **Execute Test** to begin throughput.



The screenshot shows the CyBluetooth application window with the 'Throughout Test' tab selected. The interface is divided into 'Transmit Test' and 'Receive Test' sections.

**Transmit Test Configuration:**

- Mode: POINT\_TO\_POINT
- Connection Handle: 0xB
- 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
- Fixed write size: 1021 bytes
- Isynchronous: 10 ms interval
- Data pattern: 1 2 3 4 5 6 7 8 9
- Count: 999999
- Total bytes: 89999991(0x55D4A77)
- Synchronize with local transport: ☒ COM5
- Execute Test button

**Receive Test Configuration:**

- Connection Handle: 0xB
- 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
- Isynchronous: 1021 bytes per chunk 10 ms Interval
- 5 ms Delay tolerance
- Data pattern: 1 2 3 4 5 6 7 8 9
- Count: 999999
- Total bytes: 89999991(0x55D4A77)
- Synchronize with local transport: ☒ COM5
- Execute Test button
- Bit errors: 0(0x0)
- Dropped bytes: 0(0x0)
- Delayed packets: N/A
- Average delay: N/A
- Maximum delay: N/A

The bottom of the window shows tabs for HCI, Diagnostic, and **Throughout Test** (which is highlighted with a red box).

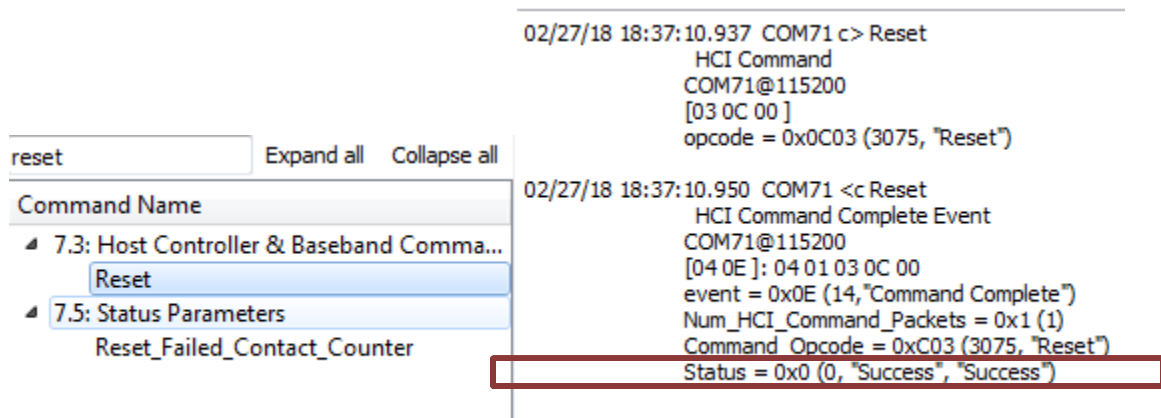
## 3. BLE Throughput Test



### 3.1 BLE Advertise Mode on Device 1 (Slave)

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

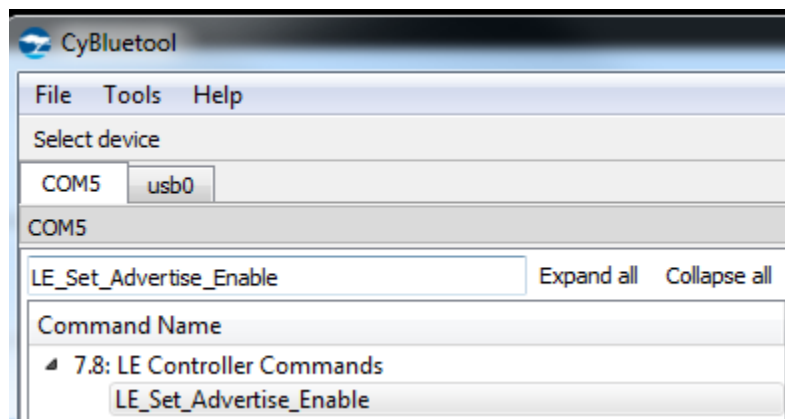
**Note:** Device reset should always be performed at the beginning of device use.



02/27/18 18:37:10.937 COM71 c> Reset  
HCI Command  
COM71@115200  
[03 0C 00]  
opcode = 0x0C03 (3075, "Reset")

02/27/18 18:37:10.950 COM71 <c Reset  
HCI Command Complete Event  
COM71@115200  
[04 0E ]: 04 01 03 0C 00  
event = 0x0E (14, "Command Complete")  
Num\_HCI\_Command\_Packets = 0x1 (1)  
Command Opcode = 0xC03 (3075, "Reset")  
Status = 0x0 (0, "Success", "Success")

2. Click on LE\_Set\_Advertise\_Enable to open the settings menu on the right-hand side.



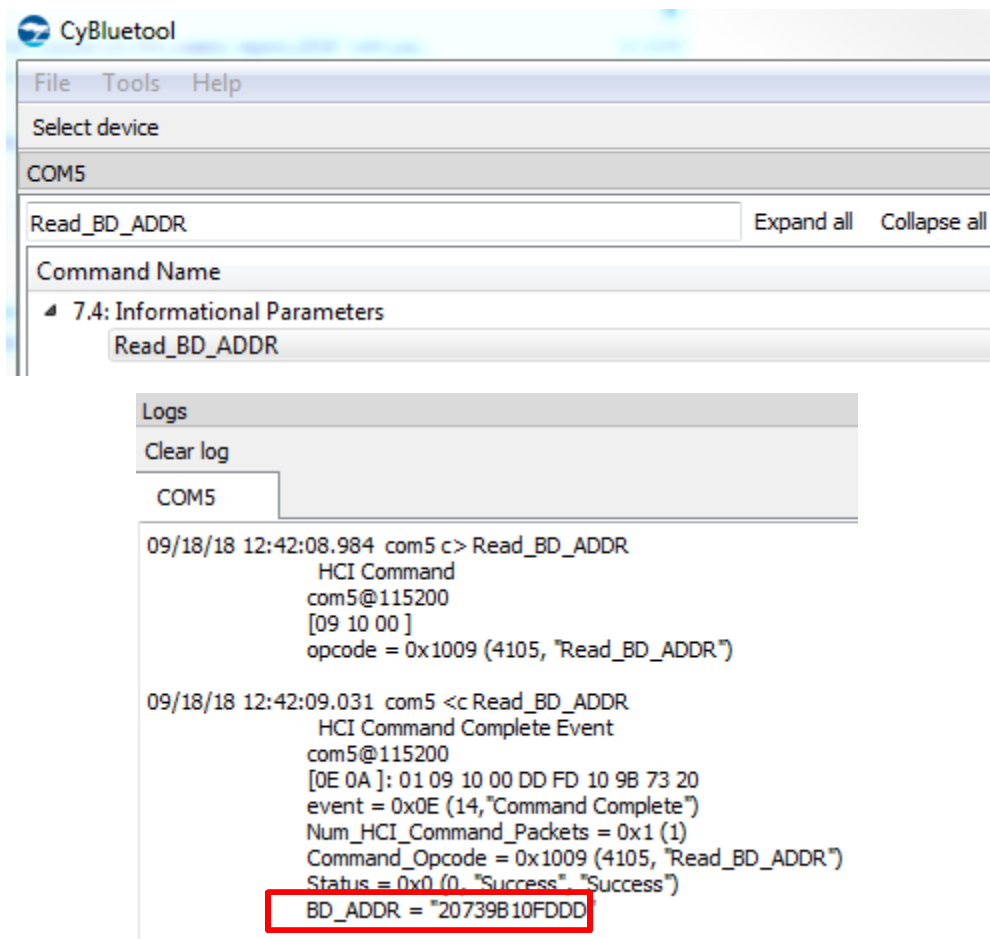
3. For the Advertising\_Enable parameter, select **Advertising is enabled** and click **Send**.

Parameter	Value
Advertising_Enable	Advertising is enabled

Description:

- Double-click Read\_BD\_ADDR.

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



The screenshot shows the CyBlue tool interface. The 'Select device' dropdown is set to 'COM5'. The 'Read\_BD\_ADDR' command is entered in the command field. The 'Command Name' section is expanded, showing '7.4: Informational Parameters' and 'Read\_BD\_ADDR'. The 'Logs' section shows the execution of the command. The log entry for 'Read\_BD\_ADDR' is highlighted with a red box, showing the BD\_ADDR as '20739B10FDD0'.

```

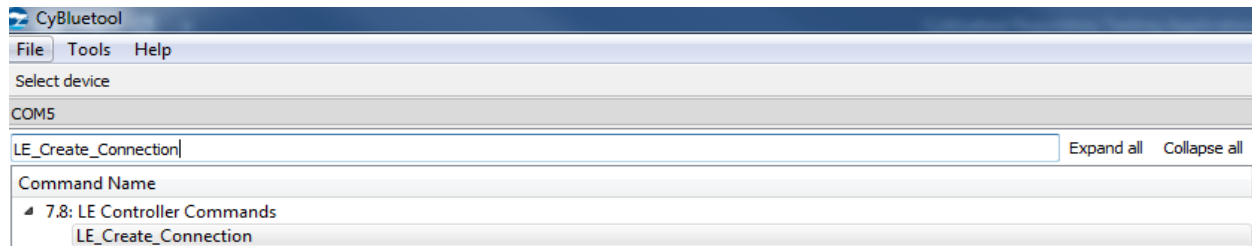
09/18/18 12:42:08.984 com5 c> Read_BD_ADDR
  HCI Command
  com5@115200
  [09 10 00 ]
  opcode = 0x1009 (4105, "Read_BD_ADDR")

09/18/18 12:42:09.031 com5 <c Read_BD_ADDR
  HCI Command Complete Event
  com5@115200
  [0E 0A ]: 01 09 10 00 DD FD 10 9B 73 20
  event = 0x0E (14, "Command Complete")
  Num_HCI_Command_Packets = 0x1 (1)
  Command_Opcode = 0x1009 (4105, "Read_BD_ADDR")
  Status = 0x00 (0, "Success", "Success")
  BD_ADDR = "20739B10FDD0"
  
```

## 3.2 Create BLE Connection with Device 2 (Master)

**IMPORTANT:** The BD\_Address of the two devices **CANNOT** be the same.

- 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**.

Parameter	Value
LE_Scan_Interval	0x64
LE_Scan_Window	0x32
InitiatorFilterPolicy	White List not used and the Peer address in this command is used
Peer_Address_Type	Public Address
Peer_Address	20739B10FDDD
Own_Address_Type	Public Address
Conn_Interval_Min	0xC8
Conn_Interval_Max	0xC8
Conn_Latency	0x0
Supervision_Timeout	0xC8
Minimum_CE_Len	0x0
Maximum_CE_Len	0x0

Description:

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.

Logs

Clear log

COM5

usb0

```

09/18/18 16:00:41.893 usb0 <e Command Status
    HCI Event
    usb0
    [0F 04]: 00 01 0D 20
    event = 0x0F (15, "Command Status")
    Status = 0x0 (0, "Success", "Success")
    Num_HCI_Command_Packets = 0x1 (1)
    Command_Opcode = 0x200D (8205, "LE_Create_Connection")

09/18/18 16:00:42.292 usb0 <e LE Event
    HCI Event
    usb0
    [3E 13]: 01 00 40 00 00 00 DD FD 10 9B 73 20 02 00 00 00 0A 00 00
    event = 0x3E (62, "LE Event")
    LE_Event_Code = 0x1 (1, "LE Connection Complete Event")
    Status = 0x0 (0, "Success", "Success")
    Connection_Handle = 0x40 (64)
    Role = 0x0 (0, "Connection is master")
    Peer_Address_Type = 0x0 (0, "Peer is using Public Address")
    Peer_Address = "20739B10FDDD"
    Connection_Interval = 0x02 (2)
    Connection_Latency = 0x00 (0)
    Supervision_Timeout = 0x0A (10)
    Master_Clock_Accuracy = 0x0 (0, "500 ppm")
  
```

### 3.3 BLE Throughput 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: 1 2 3 4 5 6 7 8 9 ☐ 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: 0:00:00:00:00  
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: 1 2 3 4 5 6 7 8 9 ☐ ASCII

☐ Data file: Browse...

Count: 9999999 Total bytes: 89999991(0x55D4A77) **Execute Test**

☒ Synchronize with local transport: COM5

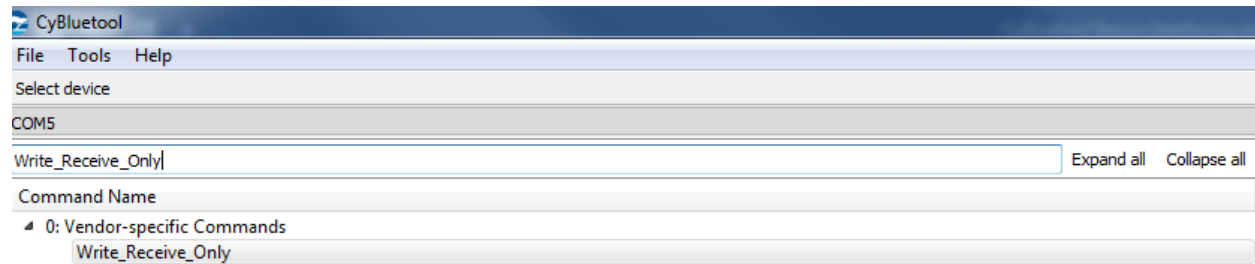
Received: 0(0x0)  
Elapsed time: 0:00:00:00:00  
Avg. throughput: Not yet measured  
Min: Not yet measured  
Max: Not yet measured  
First byte time: Not yet sent  
Last byte time: Not yet sent  
Bit errors: 0(0x0)  
Dropped bytes: 0(0x0)  
Delayed packets: N/A  
Average delay: N/A  
Maximum delay: N/A

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

Parameter	Value
Receive_Frequency	2402

Description:

An abstraction of Receive\_Frequency\_Encoded to indicate the actual frequency, from 2402 to 2480 MHz to to simplify use of the command from scripts or the user interface.

MHz

Send

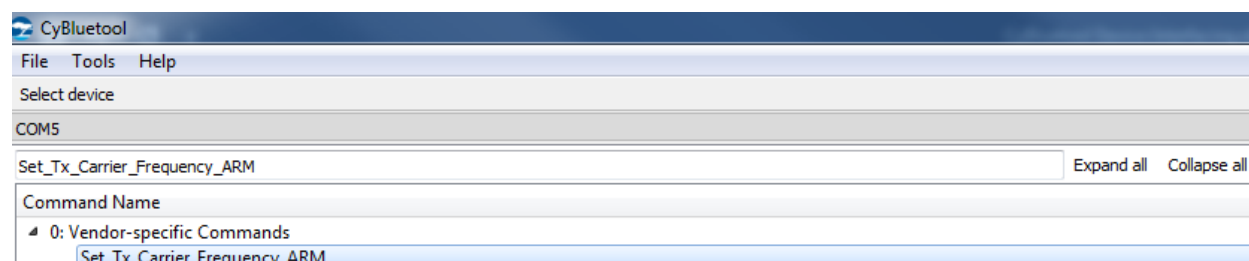


## 5. BT Transmit Tests



### 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.

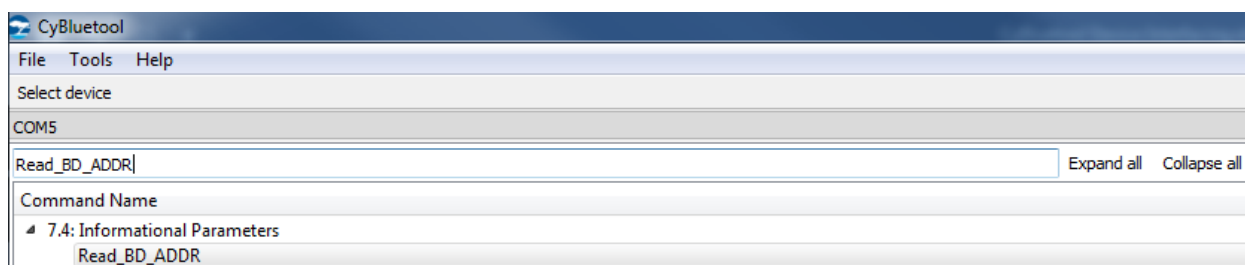
Parameter	Value
Carrier_Enable	Carrier on
Carrier_Frequency	0x962
Mode	PRBS9
Modulation Type	GFSK
Transmit_Power	Specify Power Table index
Transmit_Power_dBm	0
Transmit_Power_Table_Index	0x0

Description:

## 5.2 Frequency Hopping

### 5.2.1 ACL Basic (Basic Data Rate)

1. Double-click **Read\_BD\_ADDR**.



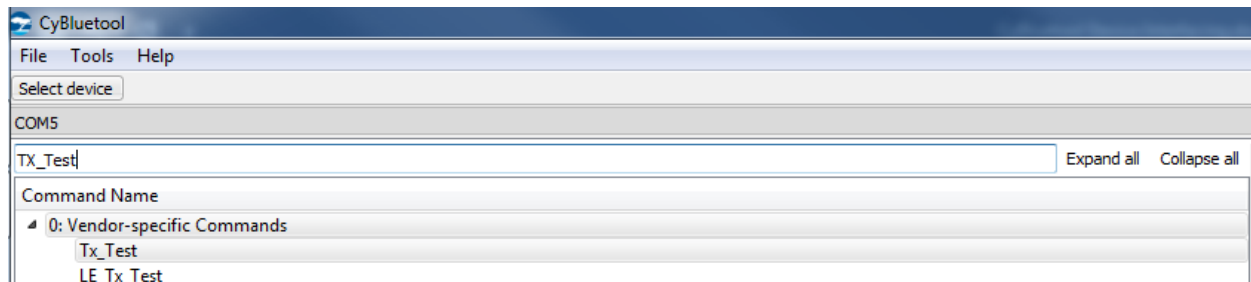
2. Locate BD\_ADDR in the Log Window.

```

Logs
Clear log
COM5
09/18/18 12:42:08.984 com5 c> Read_BD_ADDR
    HCI Command
    com5@115200
    [09 10 00 ]
    opcode = 0x1009 (4105, "Read_BD_ADDR")

09/18/18 12:42:09.031 com5 <c Read_BD_ADDR
    HCI Command Complete Event
    com5@115200
    [0E 0A ]: 01 09 10 00 DD FD 10 9B 73 20
    event = 0x0E (14, "Command Complete")
    Num_HCI_Command_Packets = 0x1 (1)
    Command_Opcode = 0x1009 (4105, "Read_BD_ADDR")
    Status = 0x00 (0, "Success", "Success")
    BD_ADDR = "20739B10FDDD"
  
```

- Click **TX\_Test** to open the settings menu on the right-hand side.



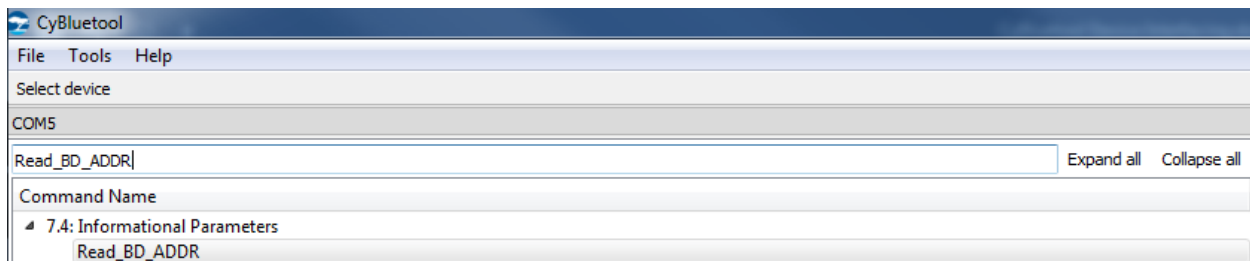
- Make the following changes and click **Send**.
  - Local\_Device\_BD\_ADDR: Enter the BD address found on Step 2.
  - Hopping\_Mode: Select **79 Channel**.
  - Modulation\_Type: Select **PRSBS9 Pattern**.
  - Logical\_Channel: Select **ACL Basic** for Basic Data Rate modulation.
  - BB\_Packet\_Type: 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**.

Parameter	Value
Local_Device_BD_ADDR	20739B10FDDD
Hopping_Mode	79 channel
Frequency	2402 MHz
Modulation_Type	PRBS9 Pattern
Logical_Channel	ACL Basic
BB_Packet_Type	DH5 / 3-DH5
BB_Packet_Length	0xFFFF
Tx_Power_Level	Specify Power Table index
Transmit_Power_dBm	0
Transmit_Power_Table_Index	0x0
Description:	

Send

## 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.

```

Logs
Clear log
COM5
09/18/18 12:42:08.984 com5 c> Read_BD_ADDR
    HCI Command
    com5@115200
    [09 10 00 ]
    opcode = 0x1009 (4105, "Read_BD_ADDR")

09/18/18 12:42:09.031 com5 <c Read_BD_ADDR
    HCI Command Complete Event
    com5@115200
    [0E 0A ]: 01 09 10 00 DD FD 10 9B 73 20
    event = 0x0E (14, "Command Complete")
    Num_HCI_Command_Packets = 0x1 (1)
    Command_Opcode = 0x1009 (4105, "Read_BD_ADDR")
    Status = 0x0 (0, "Success", "Success")
    BD_ADDR = "20739B10FDDD"
  
```

- Click **TX\_Test** to open the settings menu on the right-hand side.



- Make the following changes and click **Send**.
  - Local\_Device\_BD\_ADDR: Enter the BD address found in Step 1.
  - Hopping\_Mode: Select **79 Channel**.
  - Modulation\_Type: Select **PRBS9 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\_Table\_Index: Enter **0**.

Parameter	Value
Local_Device_BD_ADDR	20739B10FDDD
Hopping_Mode	79 channel
Frequency	2402 MHz
Modulation_Type	PRBS9 Pattern
Logical_Channel	ACL EDR
BB_Packet_Type	DH5 / 3-DH5
BB_Packet_Length	0xFFFF
Tx_Power_Level	Specify Power Table index
Transmit_Power_dBm	0
Transmit_Power_Table_Index	0x0

Description:

The length in bytes for the BB Packet type selected

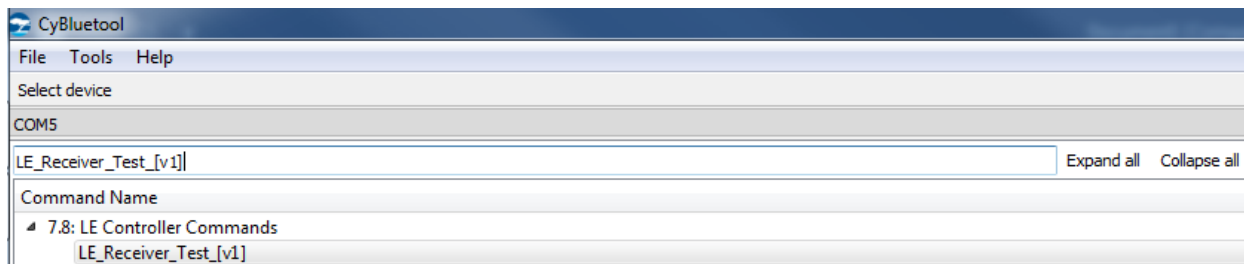
Firmware will limit len to max for BB\_Packet\_Type

**Send**

## 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**.

- $F = 2402 \text{ MHz} + [k * 2\text{MHz}]$ 
  - Low channel: 1 → 2404 MHz
  - Mid channel: 21 → 2444 MHz
  - High channel: 38 → 2478 MHz

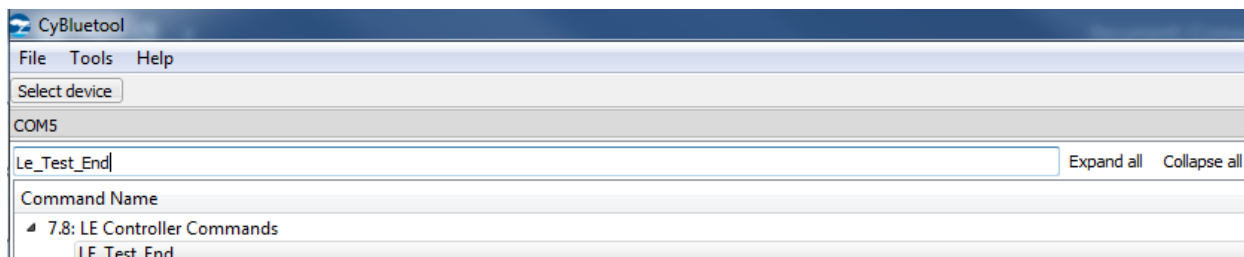
Parameter	Value
RX_Channel	0x1

Description:

( $F = 2402 + [k * 2 \text{ MHz}]$ )

3. Double-click **LE\_Test\_End** to end the test.

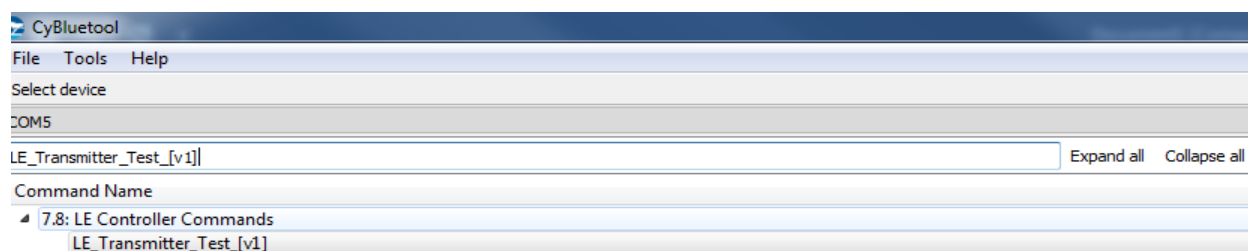
**Note:** This command ends the current LE test and allows a new test to run.



## 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:
    - $F = 2402\text{MHz} + [k * 2\text{MHz}]$ .
    - 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**.

Parameter	Value
TX_Channel	0x1
Length_of_Test...	0x25
Packet_Payload	Pseudo-Random bit sequence 9

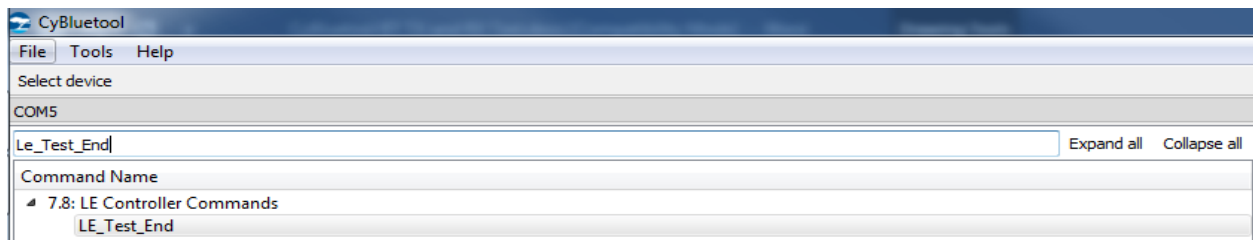
Description:

( $F = 2402 + [k * 2\text{MHz}]$ )

Send

3. Double-click **LE\_Test\_End** to end the test.

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





# Revision History



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