

Bluetooth and BLE Test with CyBluetool

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Murata Manufacturing Co., Ltd.

Revision History

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Revision 1.0	2019/03/06	Initial
Revision 1.1	2019/09/06	3. Firmware Download Added Type1QP make target.

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1. About this Document

1.1. Purpose and Scope

This document provides instructions to use CyBluetool that is a software to run the Murata Type1LD and Type1QP module for Bluetooth and BLE test.

1.2. References documentation

N1-4629_Type1LD-Quick_Start_Guide.pdf

N1-4799_Type1QP-Quick_Start_Guide.pdf

2. Setting up CyBluetool

CyBluetool is available for download from the Cypress WICED website.

A) Cybluetool user's guide is available as below site also.

<https://community.cypress.com/docs/DOC-16475>

B) Download CyBluetool from the WICED Communities website.

<https://community.cypress.com/docs/DOC-15585> (for Windows)

<https://community.cypress.com/docs/DOC-15586> (for Linux)

C) Install CyBluetool.

3. Firmware Download

This is a normal way to download firmware with Wiced build option.

Please use bt_mfg_test application with below build option.

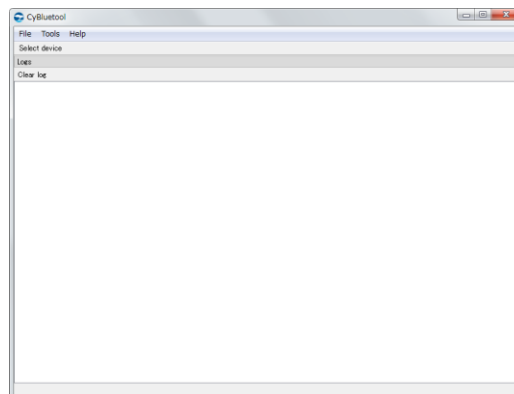
test.bt_mfg_test-MurataType1LD download run

test.bt_mfg_test-MurataType1QP download run

Note) For more detail firmware download, please refer to documents of [1.2. References documentation].

4. Start CyBluetool

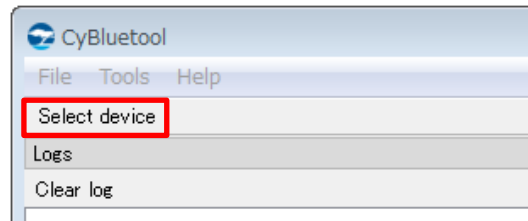
Start the CyBluetool by selecting, START > All Programs > Cypress > CyBluetool > CyBluetool.



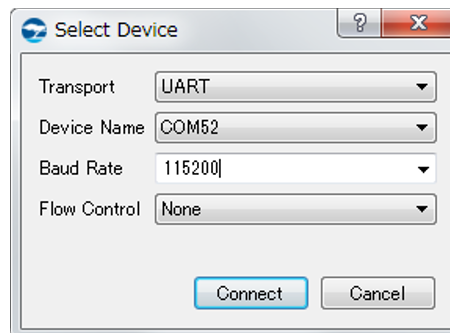
5. Initialization

5.1. Reset by HCI Command

Click the [Select device] button.

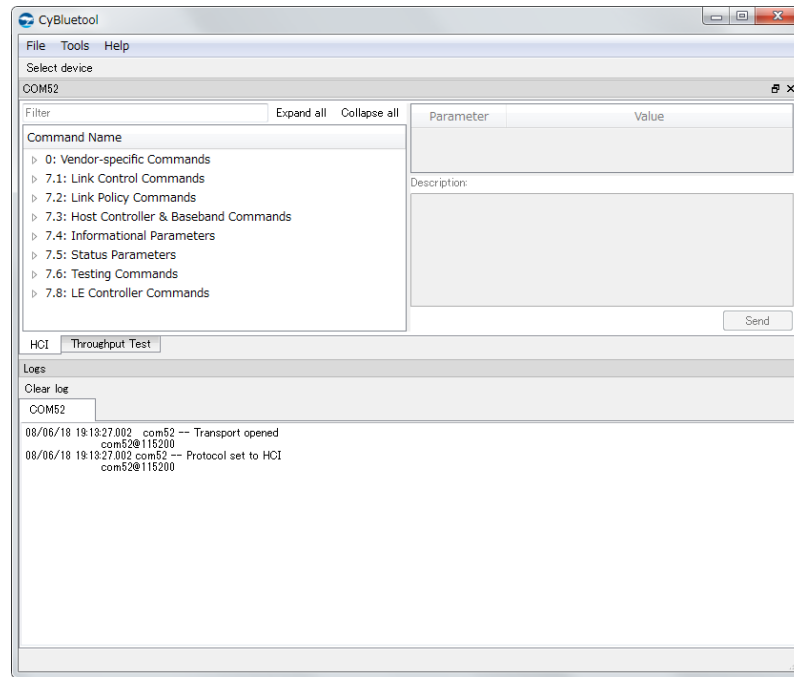


The [Select Device] screen is displayed, and execute the following process.



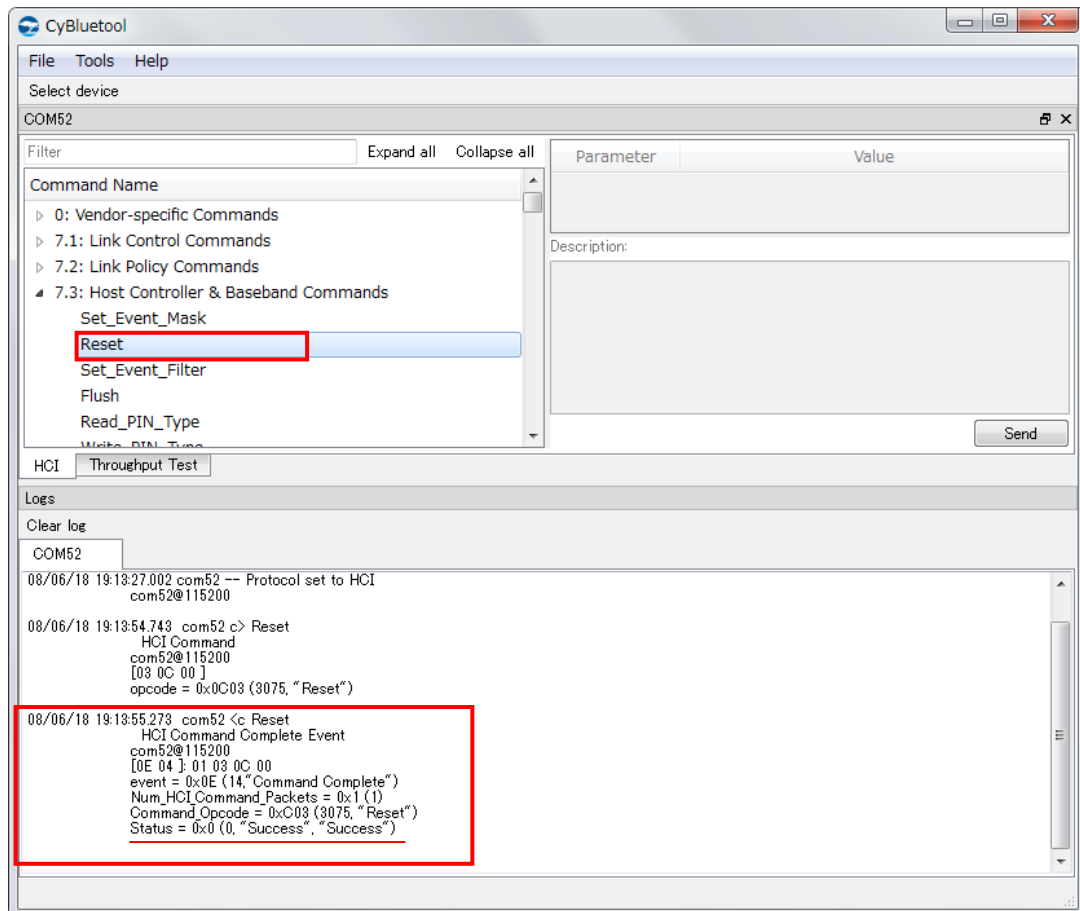
- A) Select [UART].
- B) Select the port number which is used.
- C) Change [Flow Control] to None.
- D) Push the [Connect] button.

After you push the [connect] button, the following screen is displayed.



E) Reset

Select [7.3: Host Controller & Baseband Commands] from [HCI Command] window, double click [Reset].

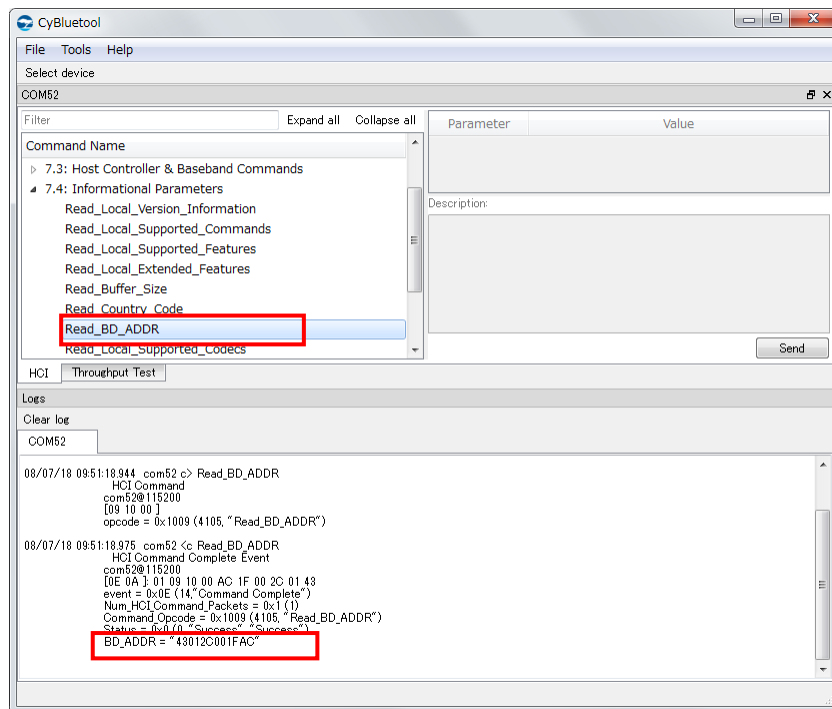


If the response is [Status = 0x0 (0, "Success", "Success")], reset is success.

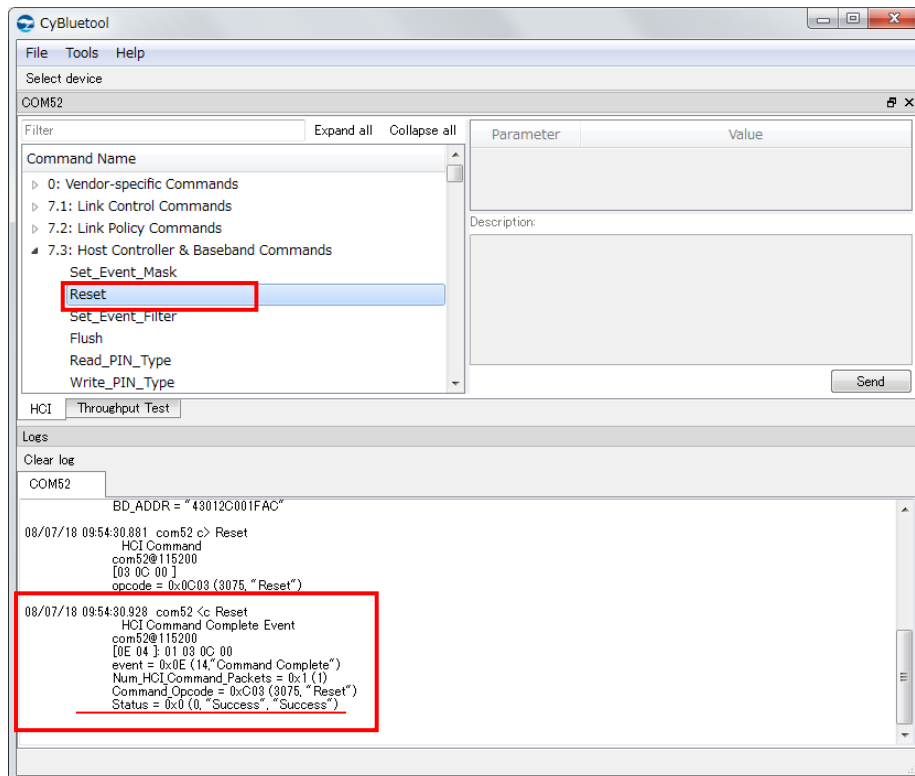
5.2. Confirm the BD Address read

A) Double click [Read BD Address] in [7.4: Informational Parameters].

The BD Address is displayed in Log window.



B) Select [7.3: Host Controller & Baseband Commands] in [HCI Command] window, double click [Reset].

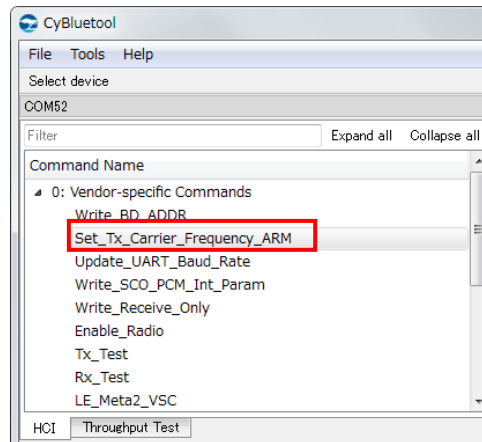


If the response is [Status = 0x0 (0, "Success", "Success")], reset is success.

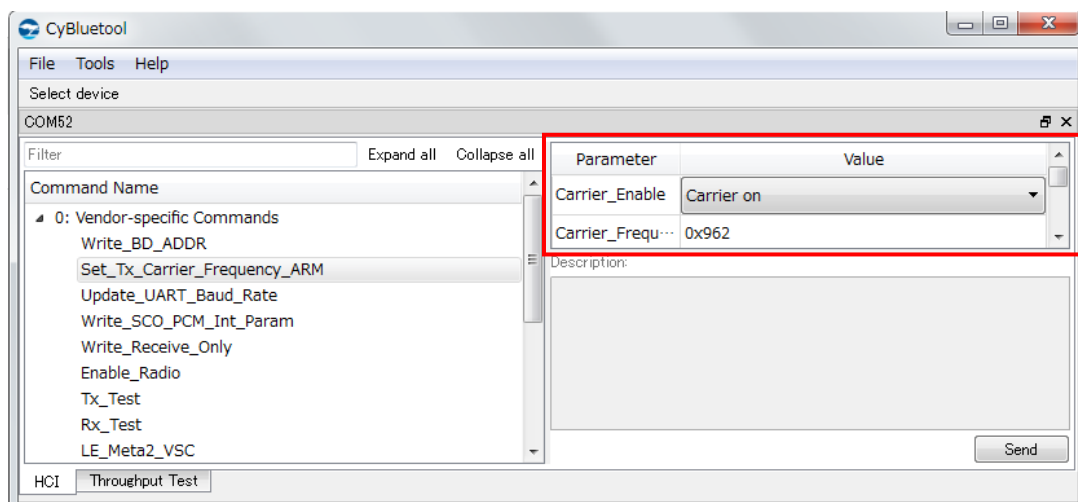
6. How to set BT

6.1. Tx CW

- A) Click [Set_Tx_Carrier_Frequency_ARM] in [0: Vendor-specific Commands].



The parameter setting window is displayed on right window.



B) Change [Carrier_Frequency] and [Transmit_power].

Click the [Send] button.

Please input 2402/2442/2480 in [Carrier_Frequency].

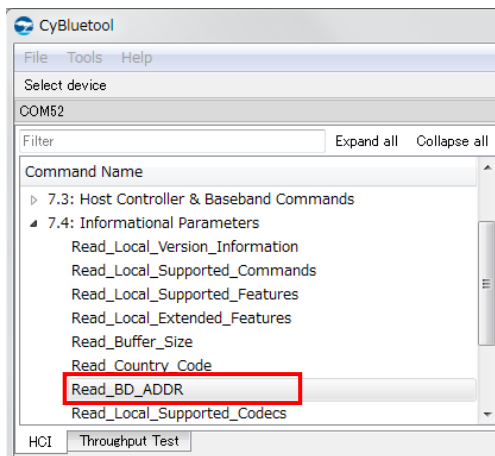
Parameter	Value
Carrier_Enable	Carrier on
Carrier_Frequ...	0x962
Mode	Unmodulated
Modulation T...	GFSK
Transmit_Po...	Specify Power Table index
Transmit_Po...	0
Transmit_Po...	0x0

C) If you want to finish, select [Set_Tx_Carrier_Frequency_ARM] in HCI command and change [Carrier_Enable] to [Carrier off].

The screenshot shows the CyBluetool application window. On the left, under 'Command Name', the command 'Set_Tx_Carrier_Frequency_ARM' is selected and highlighted with a red box. On the right, the 'Parameter' table shows 'Carrier_Enable' set to 'Carrier off' and 'Carrier_Frequ...' set to '0x962'. The 'Send' button is located at the bottom right of the parameter table.

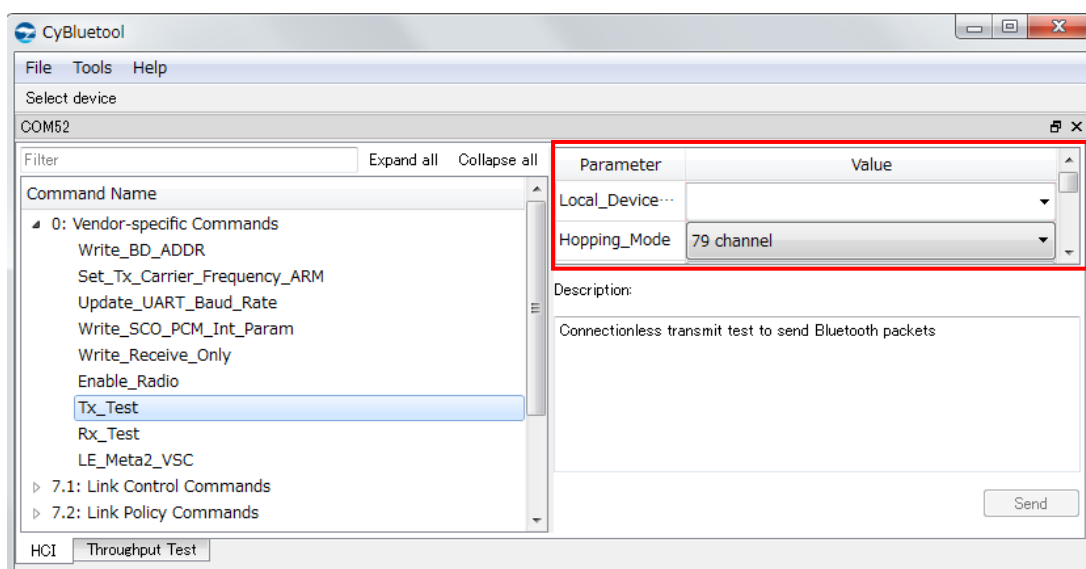
6.2. Hopping ON Tx Test

A) Double click [Read BD Address] in [7.4: Informational Parameters].



B) Click [Tx_Test] in [0: Vendor-specific Commands].

The parameter setting window is displayed on right window.



C) Change parameters according to the test.

Push the [Send] button.

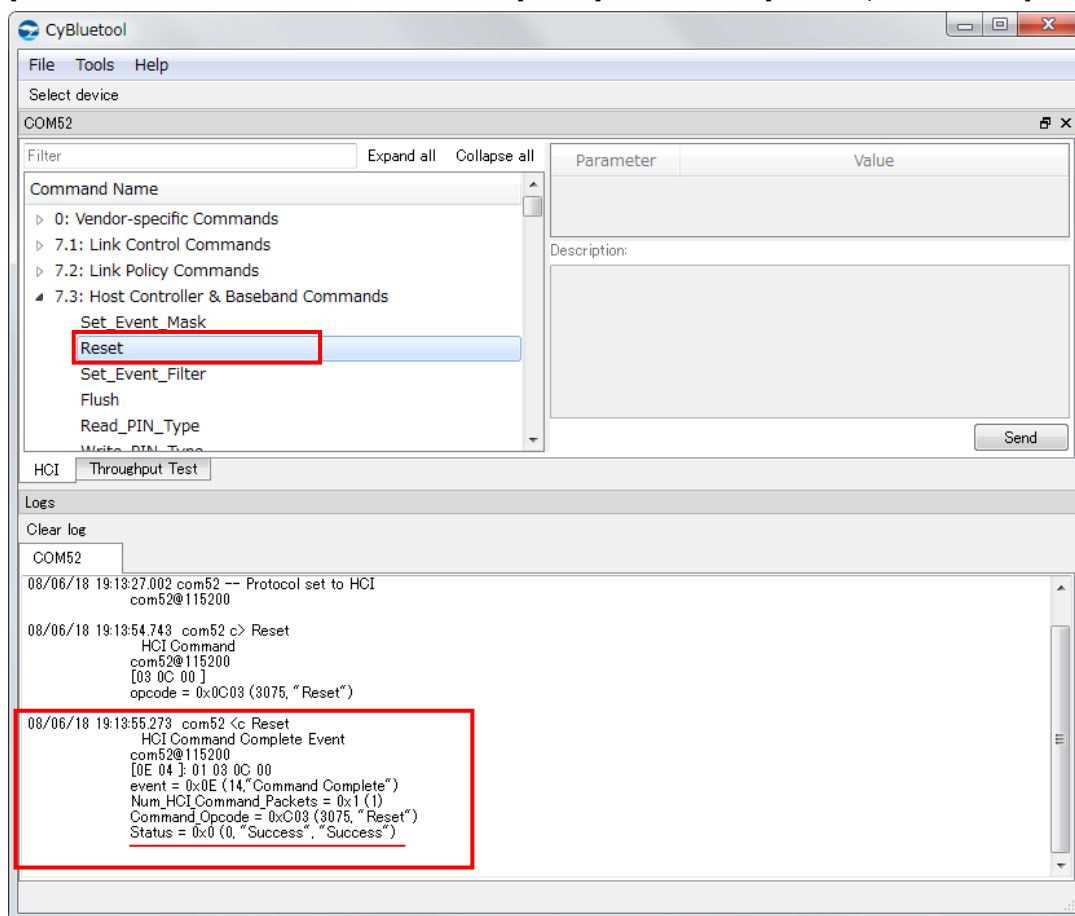
Parameter	Value
Local_Device_BD_ADDR	43012C001FAC
Hopping_Mode	79 channel
Frequency	2402 MHz
Modulation_Type	PRBS9 Pattern
Logical_Channel	ACL Basic
BB_Packet_Type	DH5 / 3-DH5
BB_Packet_Length	0x153
Tx_Power_Level	Specify Power Table index
Transmit_Power_dBm	0
Transmit_Power_Table_Index	0x0

- ✓ Local_Device_BD_ADDR : the value of [Read BD Address]
- ✓ Hopping_Mode : 79channel
- ✓ Tx_Power_Level : Specify Power Table index
- ✓ Logical_Channel/BB_Packet_Type/BB_Packet_Length are as follows.

BB_Packet_Type	Logical_Channel	BB_Packet_Length
DH1	ACL Basic	27
DH3	ACL Basic	183
DH5	ACL Basic	339
2DH1	ACL EDR	54
2 DH3	ACL EDR	369
2 DH5	ACL EDR	679
3 DH1	ACL EDR	83
3 DH3	ACL EDR	552
3 DH5	ACL EDR	1021

D) If you want to finish, execute [Reset].

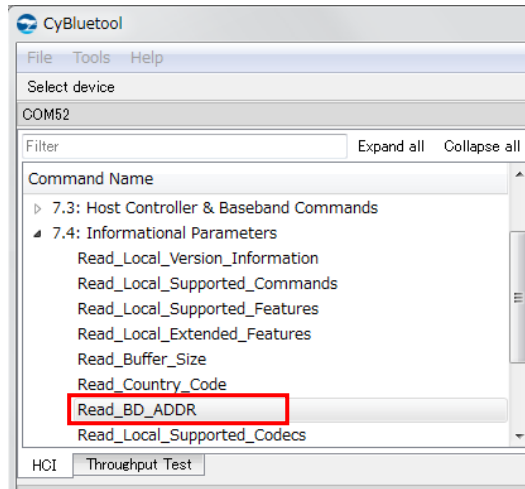
Select [7.3: Host Controller & Baseband Commands] from [HCI Command] window, double click [Reset].



If the response is [Status = 0x0 (0, "Success", "Success")], reset is success.

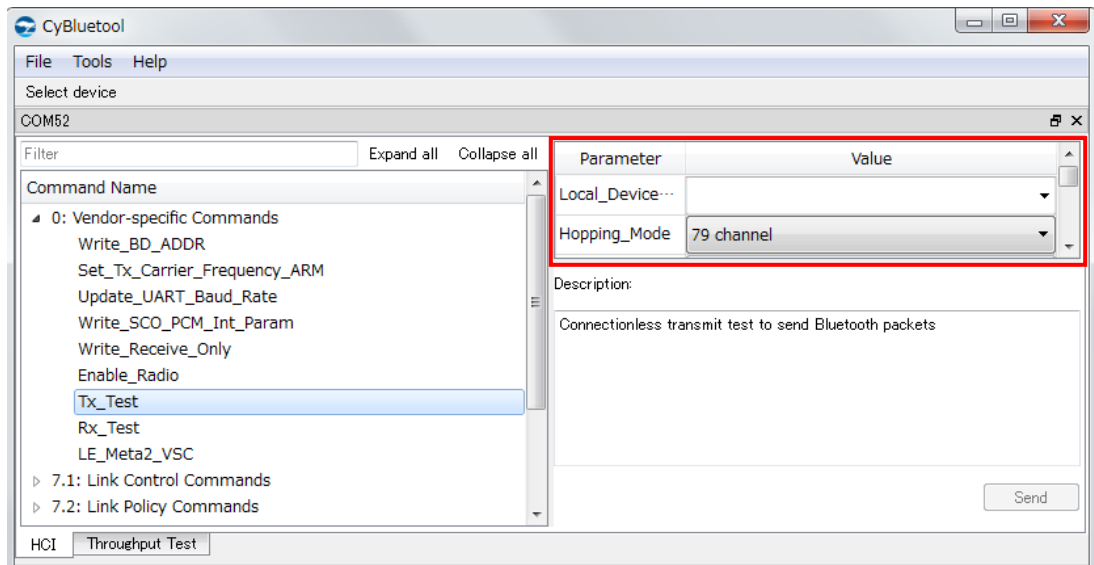
6.3. Hopping OFF Tx Test

A) Double click [Read BD Address] in [7.4: Informational Parameters].



B) Click [Tx_Test] in [0: Vendor-specific Commands].

The parameter setting window is displayed on right window.



C) Change parameters according to the test.

Push the [Send] button.

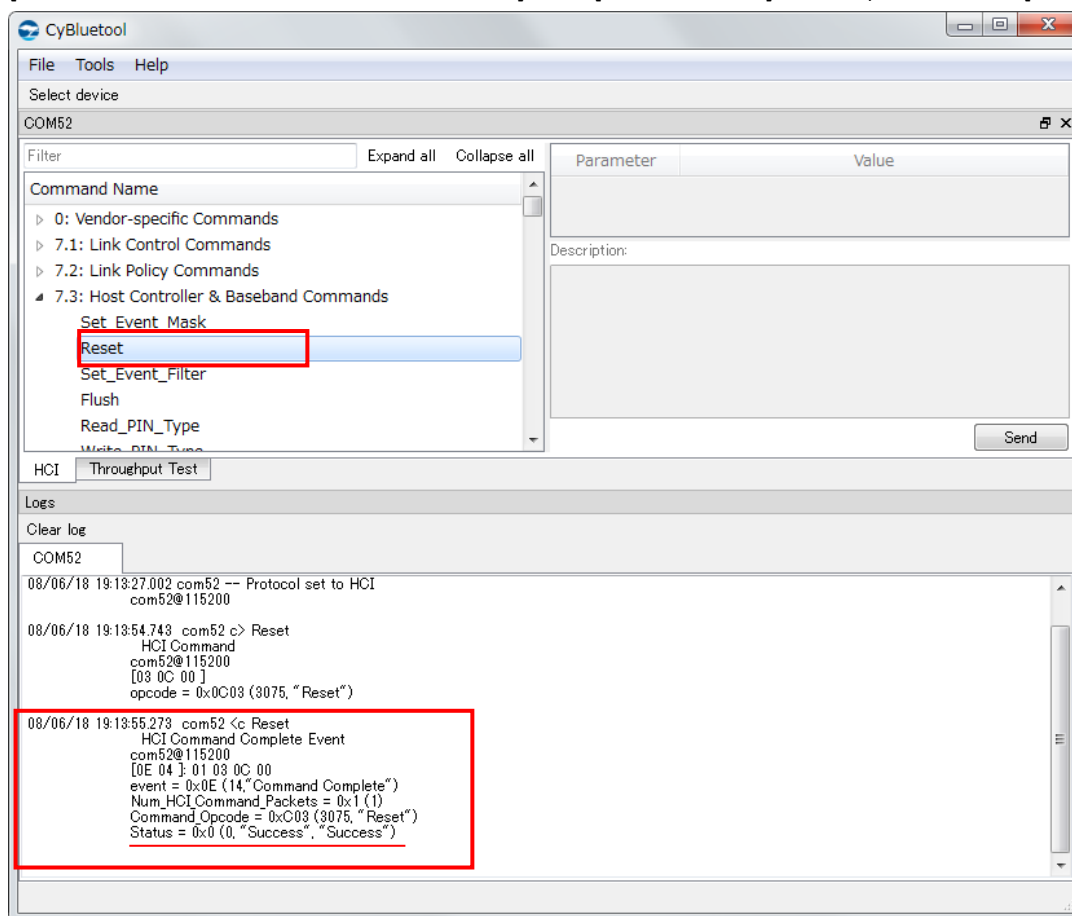
Parameter	Value
Local_Device_BD_ADDR	43012C001FAC
Hopping_Mode	Single frequency
Frequency	2402 MHz
Modulation_Type	PRBS9 Pattern
Logical_Channel	ACL Basic
BB_Packet_Type	DH5 / 3-DH5
BB_Packet_Length	0x153
Tx_Power_Level	Specify Power Table index
Transmit_Power_dBm	0
Transmit_Power_Table_Index	0x0

- ✓ Local_Device_BD_ADDR : the value of [Read BD Address]
- ✓ Hopping_Mode: Single frequency
- ✓ Frequency: 2402/2441/2480
- ✓ Tx_Power_Level: Specify Power Table index
- ✓ Logical_Channel/BB_Packet_Type/BB_Packet_Length are as follows.

BB_Packet_Type	Logical_Channel	BB_Packet_Length
DH1	ACL Basic	27
DH3	ACL Basic	183
DH5	ACL Basic	339
2DH1	ACL EDR	54
2 DH3	ACL EDR	369
2 DH5	ACL EDR	679
3 DH1	ACL EDR	83
3 DH3	ACL EDR	552
3 DH5	ACL EDR	1021

D) If you want to finish, execute [Reset].

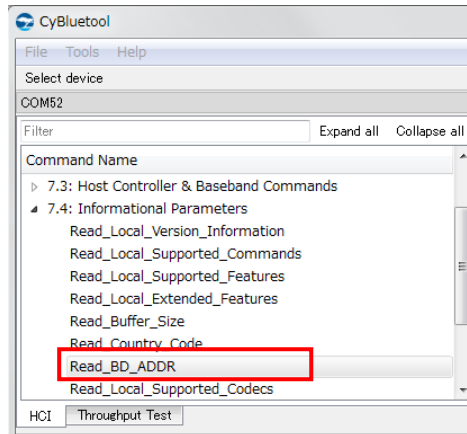
Select [7.3: Host Controller & Baseband Commands] from [HCI Command] window, double click [Reset].



If the response is [Status = 0x0 (0, "Success", "Success")], reset is success.

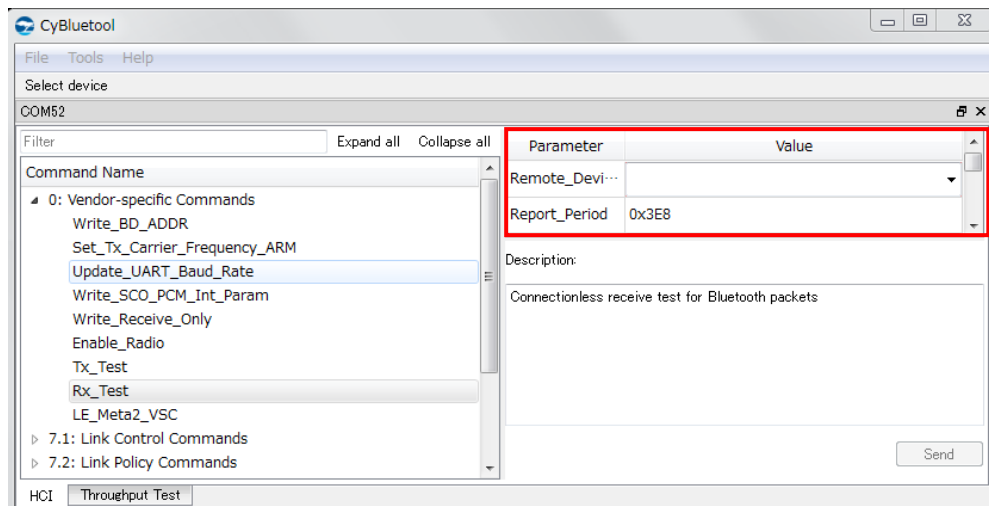
6.4. Rx Test

A) Double click [Read BD Address] in [7.4: Informational Parameters].



B) Click [Rx_Test] in [0: Vendor-specific Commands].

The parameter setting window is displayed on right window.



C) Change [Remote_Device_BD_ADDR] to the value of [READ BD Address].

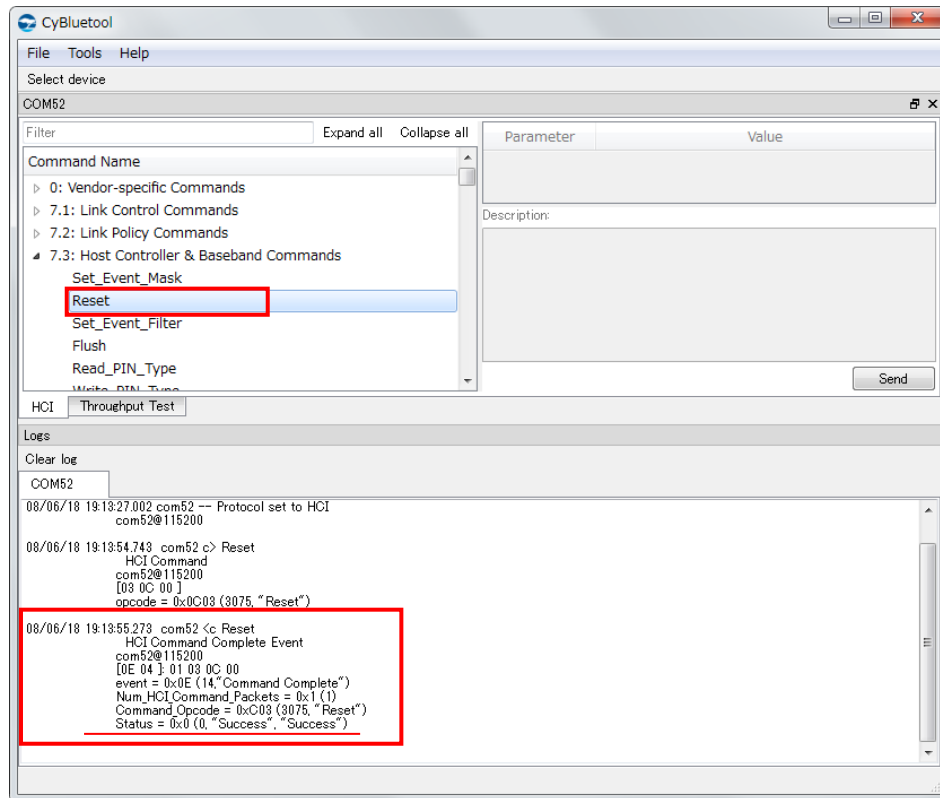
Change [Frequency] to the channel which you want to receive.

Push the [Send] button.

Parameter	Value
Remote_Device_BD_ADDR	43012C001FAC
Report_Period	0x3E8
Frequency	2402 MHz
Modulation_Type	PRBS9 pattern
Logical_Channel	ACL Basic
BB_Packet_Type	DH5 / 3-DH5
BB_Packet_Length	0x0

D) If you want to finish, execute [Reset].

Select [7.3: Host Controller & Baseband Commands] from [HCI Command] window, double click [Reset].



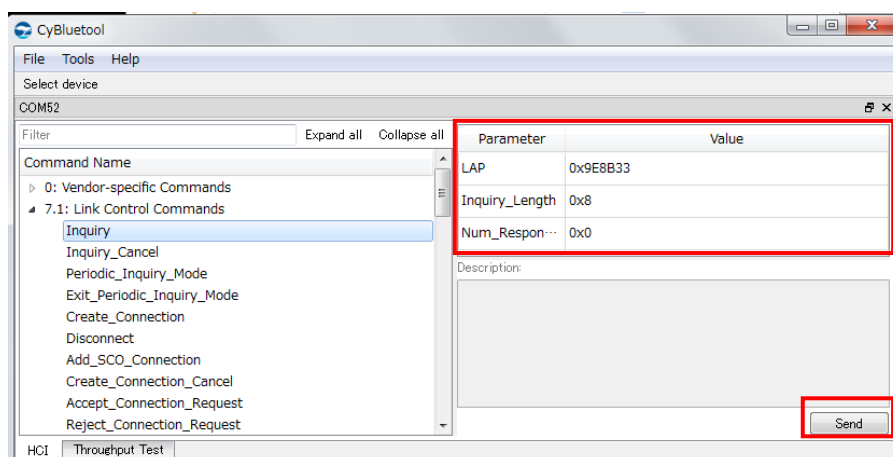
If the response is [Status = 0x0 (0, "Success", "Success")], reset is success.

6.5. Inquiry

A) Click [Inquiry] in [7.1: Link Control Commands].

The parameter setting window is displayed on right window.

Push the [Send] button.

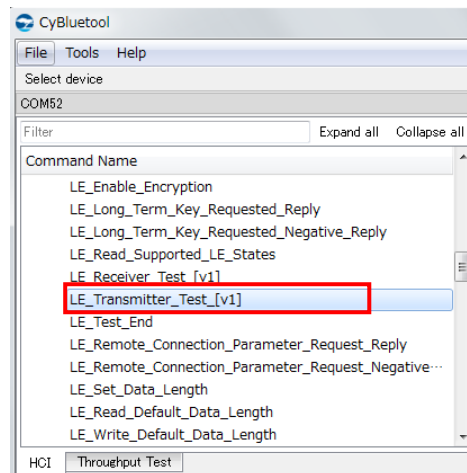


When the inquiry have finished, "Inquiry Complete" is displayed in Log window.

7. How to set BLE

7.1. Tx Test

A) Click [LE_Transmitter_Test_[v1]] in [7.8: LE Controller Commands].

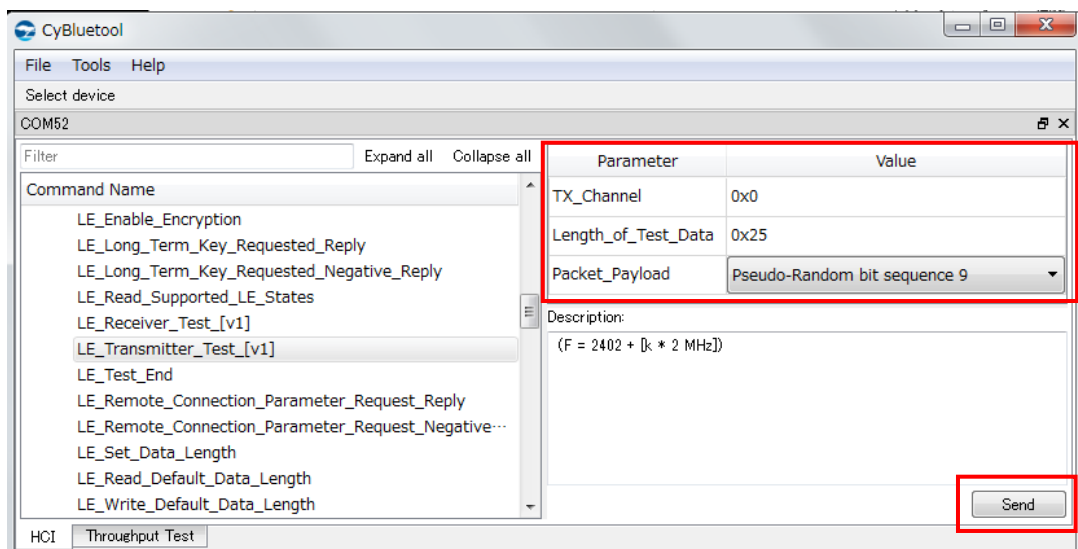


The parameter setting window is displayed on right window.

B) Change [TX_Channel] to the value based on the calculation formula.

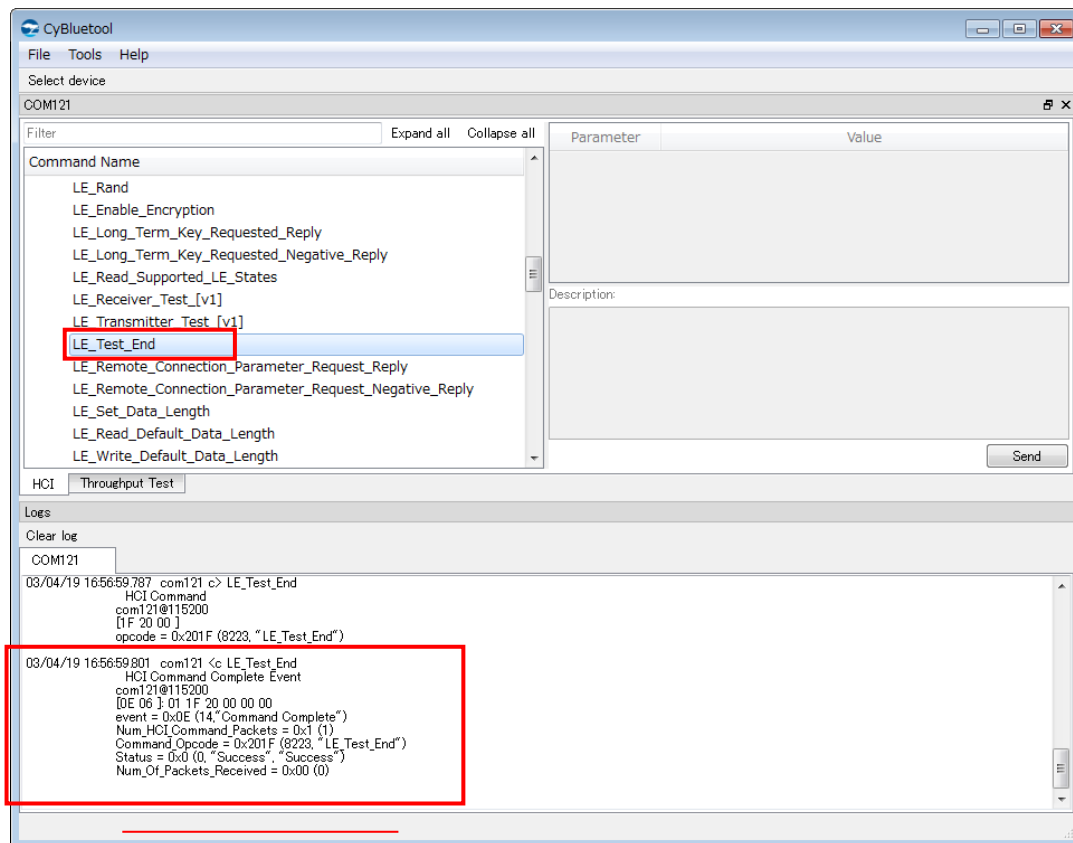
Change [Length_of_Test_Data] to 37.

Push the [Send] button.



C) If you want to finish LE_Transmitter_Test, execute [LE_Test_End].

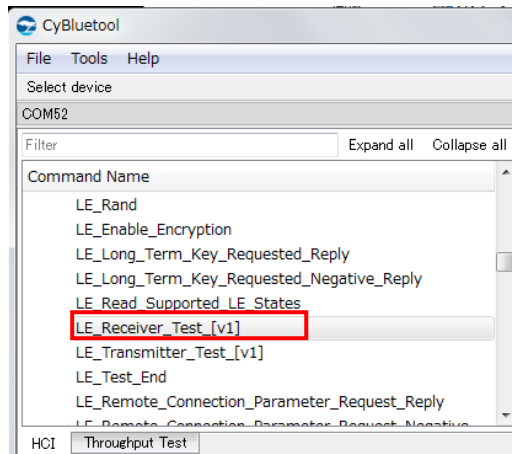
Select [7.8: LE Controller Commands] from [HCI Command] window, double click [LE_Test_End].



If the response is [Status = 0x0 (0, "Success", "Success")], LE_Test_End is success.

7.2. Rx Test

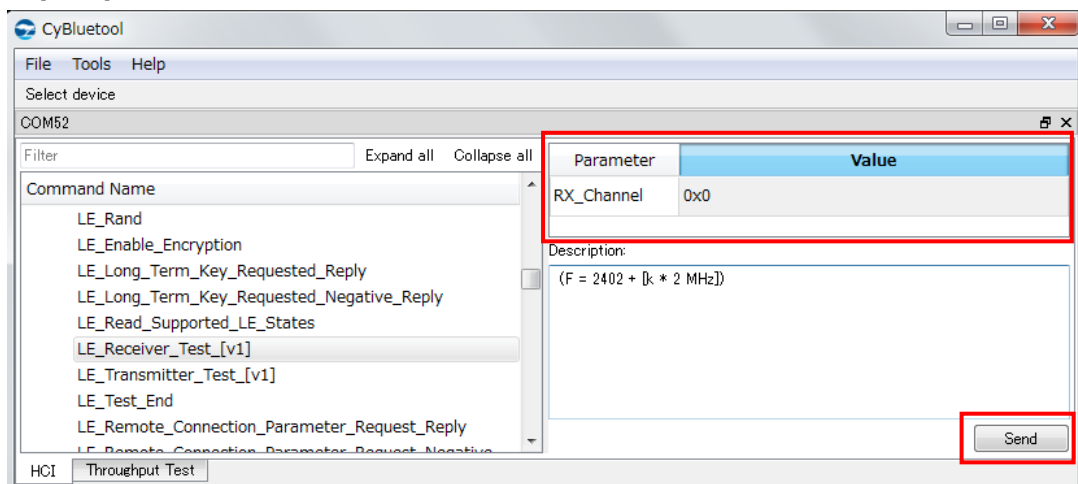
A) Click [LE_Receiver_Test_[v1]] in [7.8: LE Controller Commands].



The parameter setting window is displayed on right window.

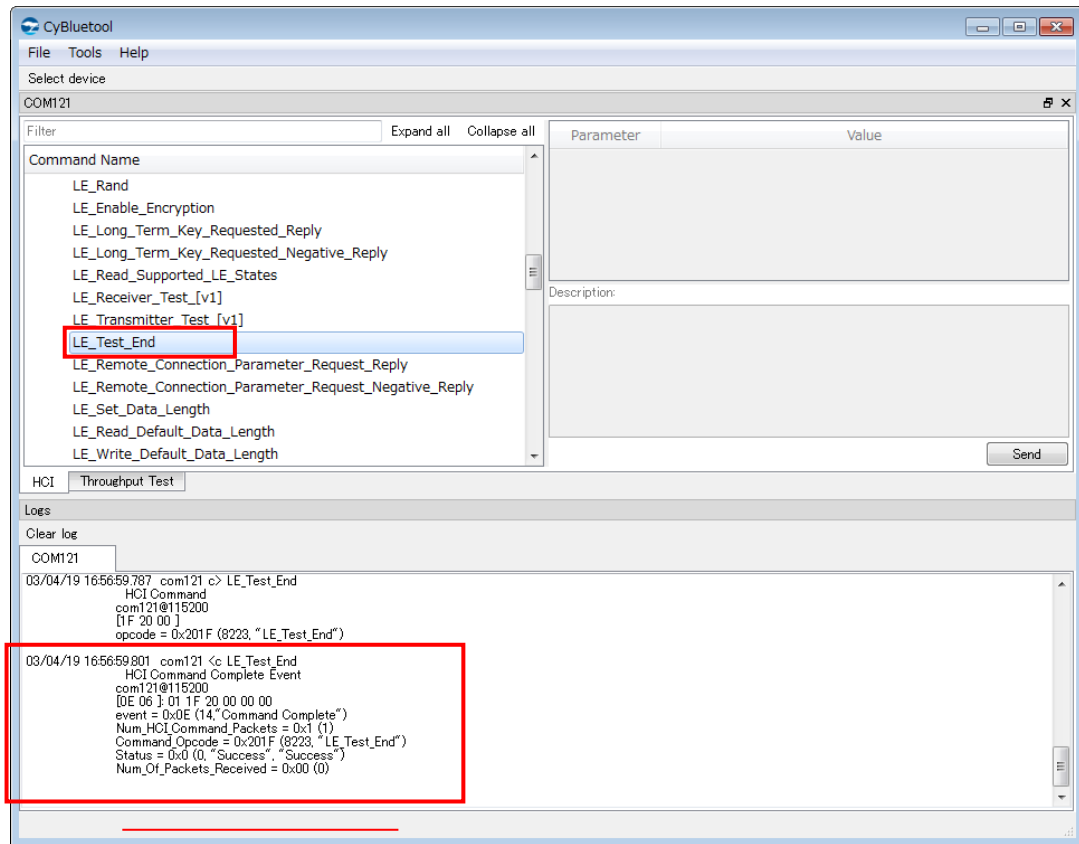
B) Change [RX_Channel] to the value based on the calculation formula.

Push the [Send] button.



C) If you want to finish LE_Receiver_Test, execute [LE_Test_End].

Select [7.8: LE Controller Commands] from [HCI Command] window, double click [LE_Test_End].



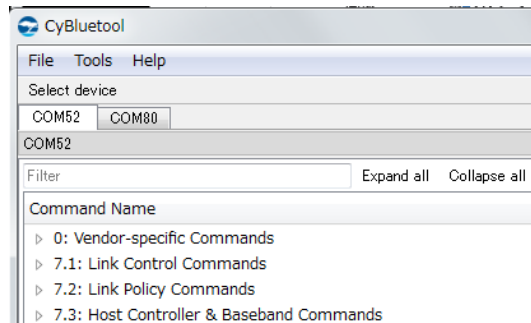
If the response is [Status = 0x0 (0, "Success", "Success")], LE_Test_End is success.

8. Connection Test

(1):EUT, (2):Facing machine

8.1. BT Connection

A) Start two HCI Command windows.

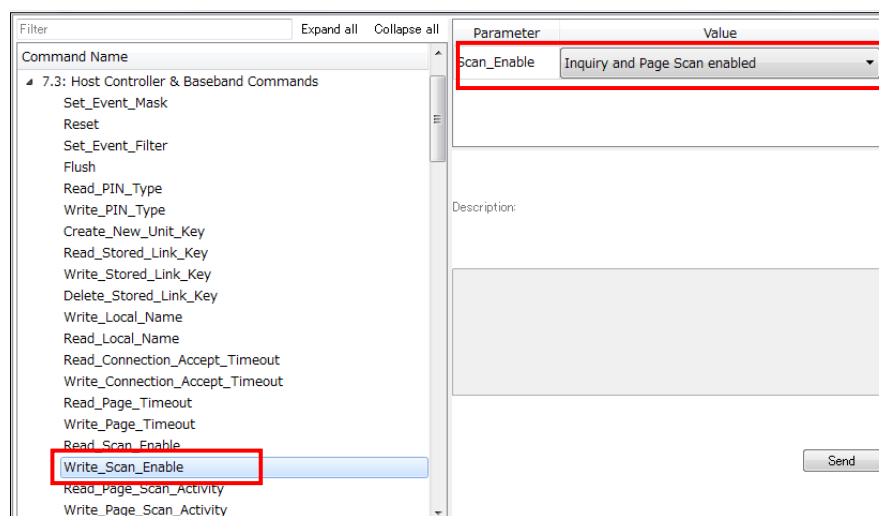


At Both (1):EUT and (2):Facing machine, click [Write_Scan_Enable] in [7.3: Host Controller & Baseband Commands].

The parameter setting window is displayed on right window.

B) Change [Scan_Enable] to [Inquiry and Page Scan enabled].

Push the [Send] button.



If the response is [Status = 0x0 (0, "Success", "Success")], scan enable is success.

```
08/07/18 16:11:17.691 com52 <c Reset
HCI Command Complete Event
com52@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")

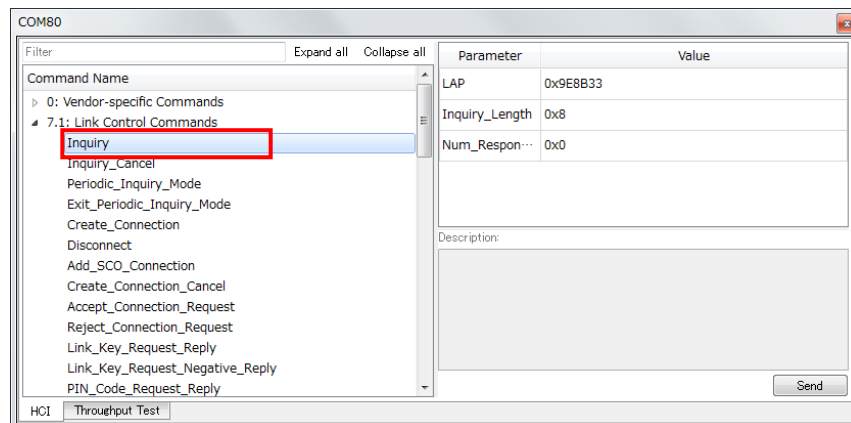
08/07/18 16:18:01.425 com52 c> Write_Scan_Enable
HCI Command
com52@115200
[1A 0C 01 ]: 03
opcode = 0x0C1A (3098,"Write_Scan_Enable")
Scan_Enable = 0x3 (3,"Inquiry and Page Scan enabled")

08/07/18 16:18:01.441 com52 <c Write_Scan_Enable
HCI Command Complete Event
com52@115200
[0E 04 ]: 01 1A 0C 00
event = 0x0E (14,"Command Complete")
Num_HCI_Command_Packets = 0x1 (1)
Command_Opcode = 0xC1A (3098,"Write_Scan_Enable")
Status = 0x0 (0,"Success","Success")
```

C) At (2):Facing machine only, click [Inquiry] in [7.1: Link Control Commands].

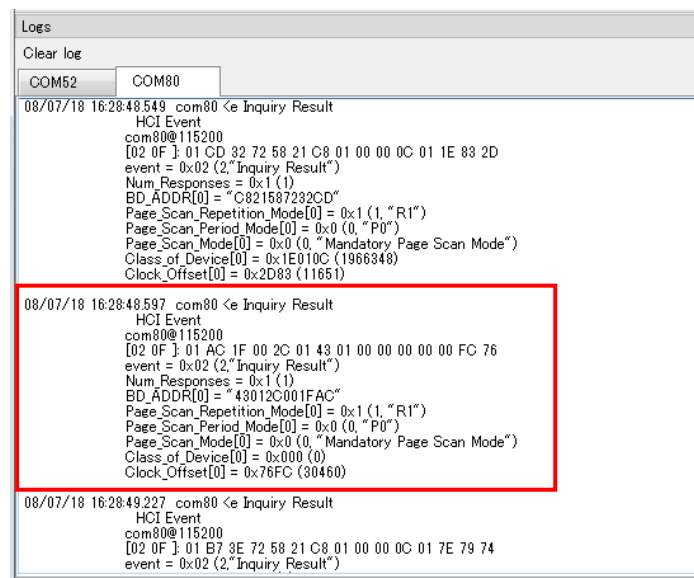
The parameter setting window is displayed on right window.

Parameter is no change. And push the [Send] button.



D) If EUT is found, the result is displayed in Log window.

(1):EUT's BD Address is [43012Cxxxxxx].

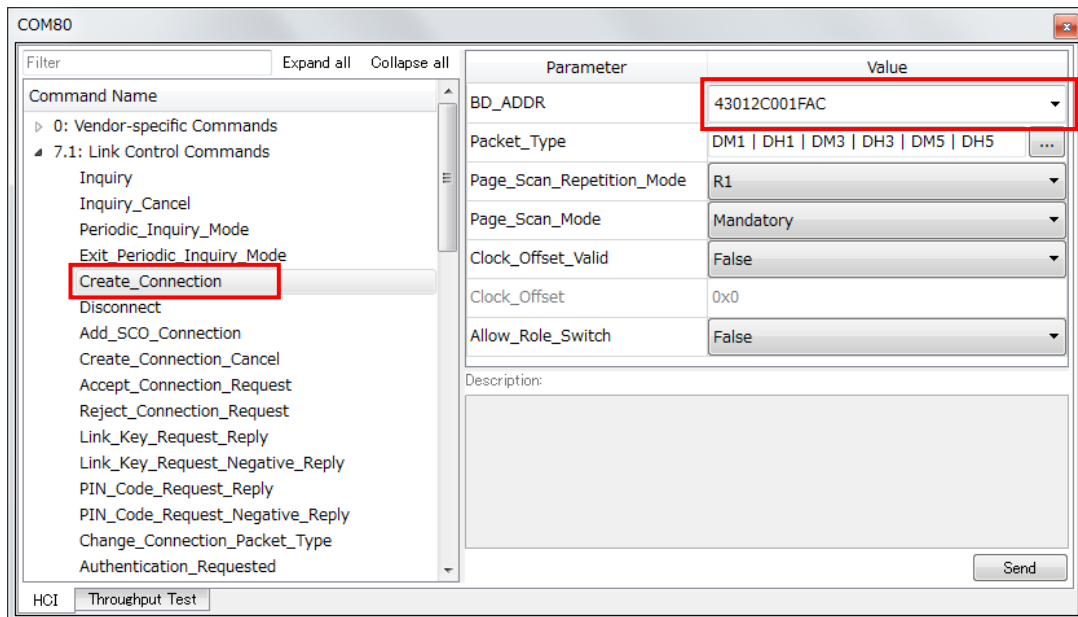


E) At (2):Facing machine only, click [Create_Connection] in [7.1: Link Control Commands].

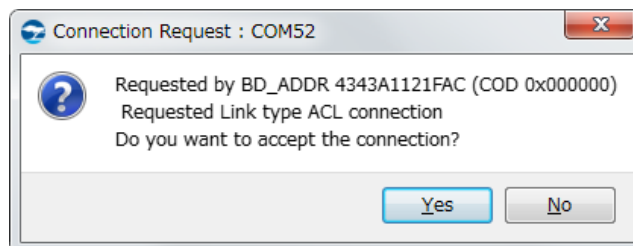
The parameter setting window is displayed on right window.

Change [BD_ADDR] to BD Address of (1):EUT.

Push the [Send] button.

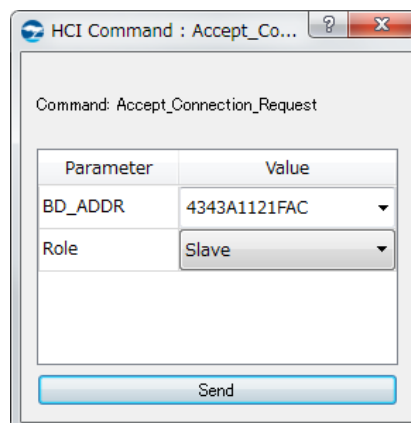


F) At (1):EUT, when the following popup is displayed, push the [Yes] button.



G) At (1):EUT, The following popup is displayed.

Change [BD_ADDR] to BD Address of (2):Facing machine. And push the [Send] button.



If the connection is successful, [Connection Complete] and [Max Slots Change] is displayed in Each Log

windows.

```

Logs
Clear log
COM52  COM80
Role = 0x1 (1, "Slave")

08/07/18 16:52:51.234 com52 <e Command Status
HCI Event
com52@115200
[0F 04]: 00 01 09 04
event = 0x0F (15, "Command Status")
Status = 0x00 (0, "Success", "Success")
Num_HCI_Command_Packets = 0x1 (1)
Command_Opcode = 0x409 (1033, "Accept_Connection_Request")

08/07/18 16:52:51.234 com52 <e Connection Complete
HCI Event
com52@115200
[03 0B]: 00 0B 00 AC 1F 12 A1 43 43 01 00
event = 0x03 (3, "Connection Complete")
Status = 0x00 (0, "Success", "Success")
Connection_Handle = 0x0B (11)
BD_ADDR = "4343A1121FAC"
Link_Type = 0x1 (1, "ACL connection")
Encryption_Status = 0x00 (0, "Link level encryption disabled")

08/07/18 16:52:51.234 com52 <e Max Slots Change
HCI Event
com52@115200
[1B 03]: 0B 00 05
event = 0x1B (27, "Max Slots Change")
Connection_Handle = 0x0B (11)
LMP_Max_Slots = 0x5 (5)

```

```

Logs
Clear log
COM52  COM80
Clock_Offset = 0x00 (0)
Allow_Role_Switch = 0x0 (0)

08/07/18 16:52:46.615 com80 <e Command Status
HCI Event
com80@115200
[0F 04]: 00 01 05 04
event = 0x0F (15, "Command Status")
Status = 0x00 (0, "Success", "Success")
Num_HCI_Command_Packets = 0x1 (1)
Command_Opcode = 0x405 (1029, "Create_Connection")

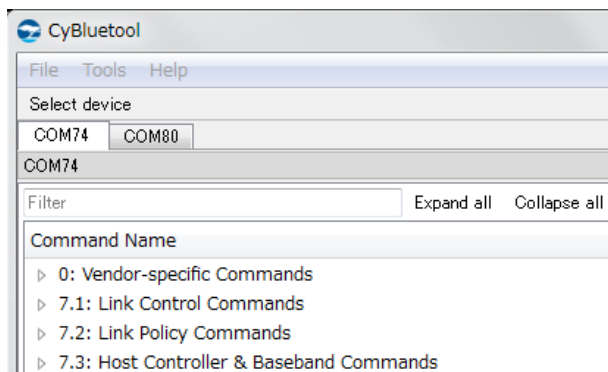
08/07/18 16:52:51.234 com80 <e Connection Complete
HCI Event
com80@115200
[03 0B]: 00 0B 00 AC 1F 00 2C 01 43 01 00
event = 0x03 (3, "Connection Complete")
Status = 0x00 (0, "Success", "Success")
Connection_Handle = 0x0B (11)
BD_ADDR = "43012C001FAC"
Link_Type = 0x1 (1, "ACL connection")
Encryption_Status = 0x00 (0, "Link level encryption disabled")

08/07/18 16:52:51.266 com80 <e Max Slots Change
HCI Event
com80@115200
[1B 03]: 0B 00 05
event = 0x1B (27, "Max Slots Change")
Connection_Handle = 0x0B (11)
LMP_Max_Slots = 0x5 (5)

```

8.2. BLE Connection

A) Start two HCI Command windows.

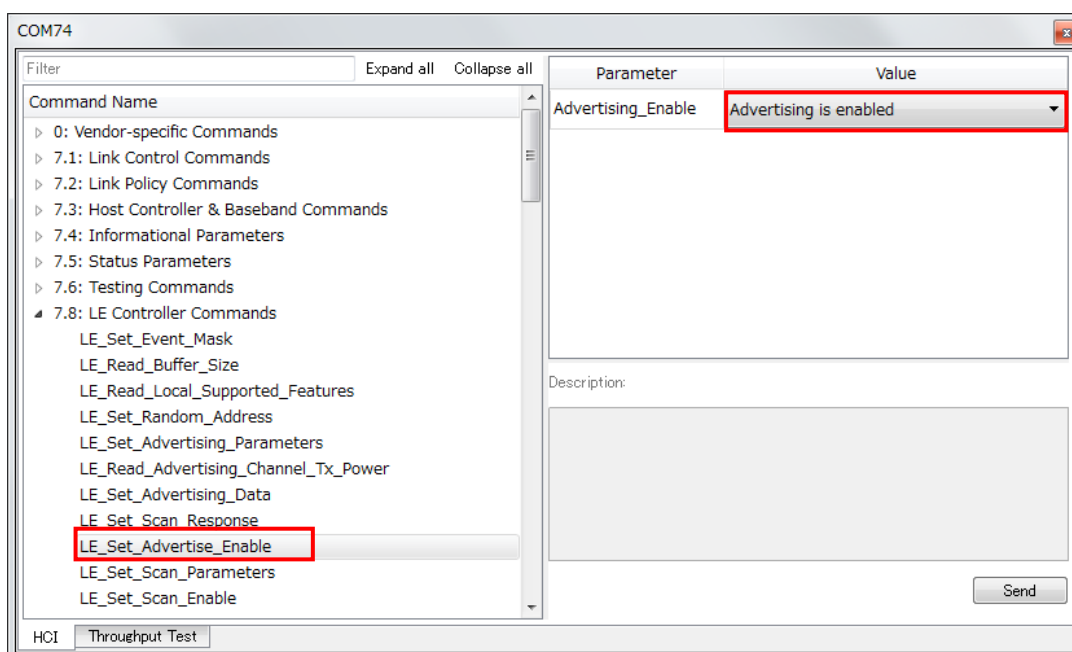


B) At (1):EUT only, click [LE_Set_Advertising_Enable] in [7.8: LE Controller Commands].

The parameter setting window is displayed on right window.

Change [Advertising_Enable] to [Advertising is enabled].

Push the [Send] button.

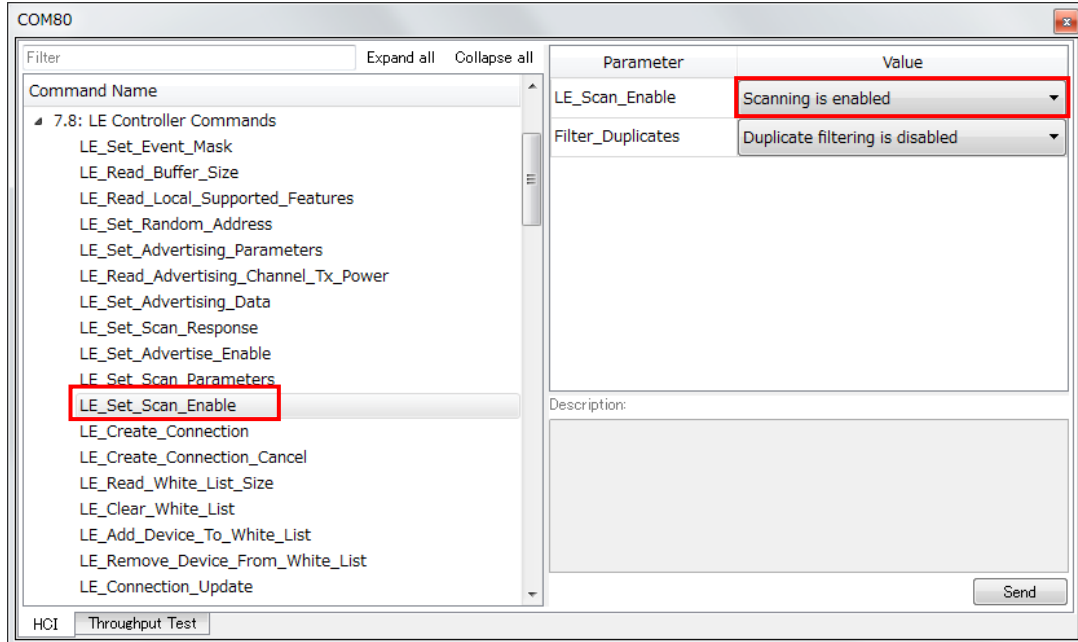


C) At (2):Facing machine only, click [LE_Set_Scan_Enable] in [7.8: LE Controller Commands].

The parameter setting window is displayed on right window.

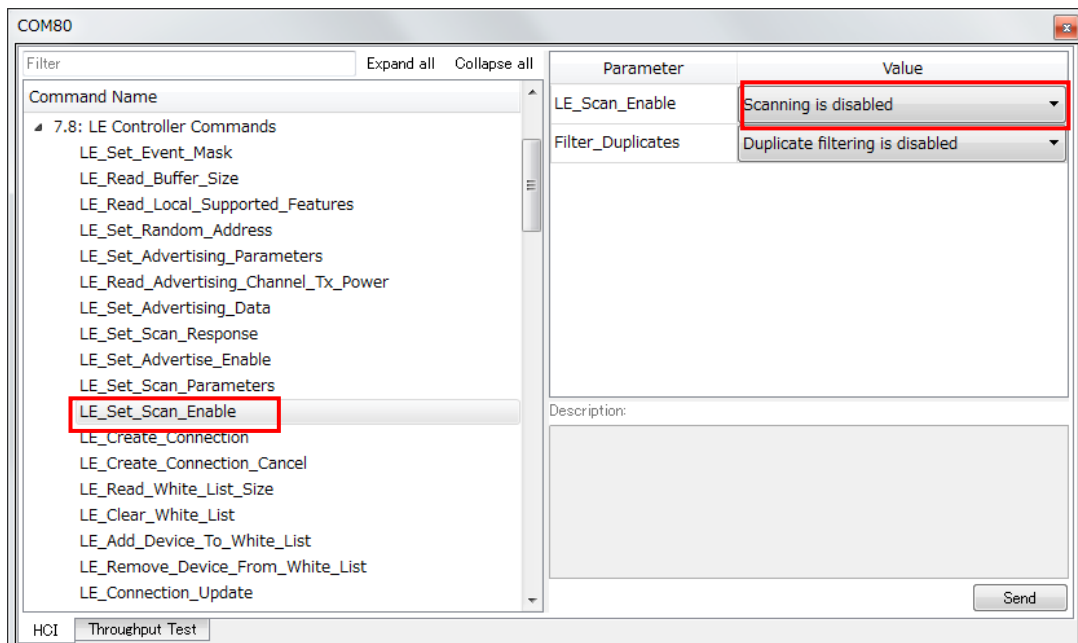
Change [LE_Scan_Enable] to [Scanning is enabled].

Push the [Send] button.



D) Change [LE_Scan_Enable] to [Scanning is disabled].

Push the [Send] button.



E) At (2):Facing machine only, click [LE_Create_Connection] in [7.8: LE Controller Commands].

The parameter setting window is displayed on right window.

Change [Peer_Address] to BD Address of (1):EUT.

Change other parameters according to the test.

Push the [Send] button.

Parameter	Value
LE_Scan_Interval	0x12
LE_Scan_Window	0x12
InitiatorFilterPolicy	White List not used and the Peer address in this command is used
Peer_Address_Type	Public Address
Peer_Address	794615BF72B0
Own_Address_Type	Public Address
Conn_Interval_Min	0x20
Conn_Interval_Max	0x20
Conn_Latency	0x0
Supervision_Timeout	0xC80
Minimum_CE_Len	0x0
Maximum_CE_Len	0x0

If the received event is [LE_Event_Code = 0x1 (1, "LE Connection Complete Event")], connection is success.

```

Logs
Clear log
COM74 COM80

08/08/18 12:18:52.794 com80 c> LE_Create_Connection
HCI Command
com80@115200
[0D 20 19 12 00 12 00 00 00 B0 72 BF 15 46 79 00 20 00 20 00 00 00 0C 00 00 00 00]
opcode = 0x200D (8205, "LE_Create_Connection")
LE_Scan_Interval = 0x12 (18, in slots, Range: 2.5ms to 10.25s)
LE_Scan_Window = 0x12 (18, in slots, Range: 2.5ms to 10.25s)
InitiatorFilterPolicy = 0x0 (0, "White List not used and the Peer address in this command is used")
Peer_Address_Type = 0x0 (0, "Public Address")
Peer_Address = "794615BF72B0"
Own_Address_Type = 0x0 (0, "Public Address")
Conn_Interval_Min = 0x20 (32)
Conn_Interval_Max = 0x20 (32)
Conn_Latency = 0x00 (0)
Supervision_Timeout = 0xC80 (3200)
Minimum_CE_Len = 0x00 (0, in slots, Range:1 to 2*Conn_Interval)
Maximum_CE_Len = 0x00 (0, in slots, Range:1 to 2*Conn_Interval)

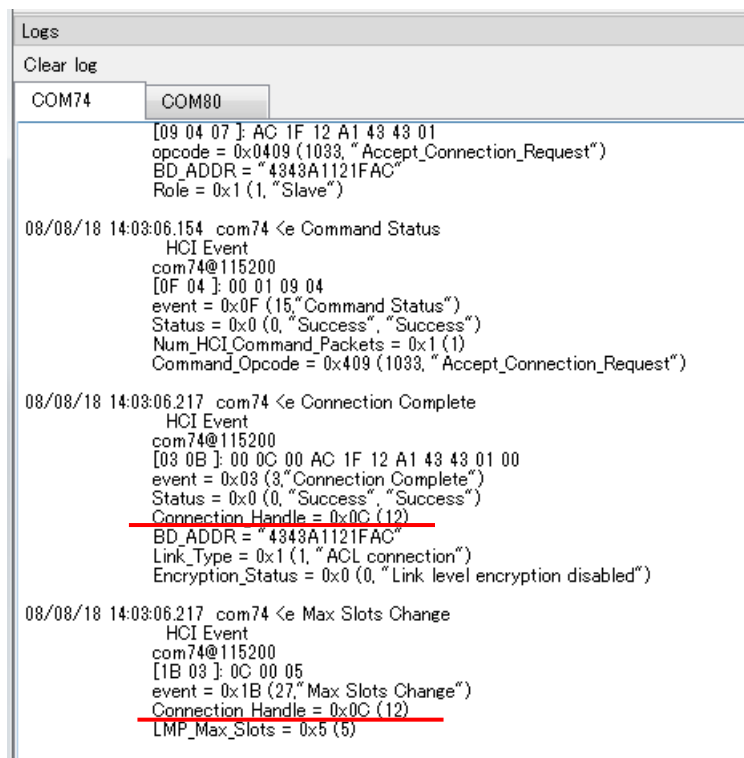
08/08/18 12:18:52.810 com80 <e Command Status
HCI Event
com80@115200
[0F 04 15 00 01 0D 20]
event = 0x0F (15, "Command Status")
Status = 0x00 (0, "Success", "Success")
Num_HCICommand_Packets = 0x1 (1)
Command_Opcode = 0x200D (8205, "LE_Create_Connection")

08/08/18 12:18:55.022 com80 <e LE Event
HCI Event
com80@115200
[3E 13 01 00 40 00 00 00 B0 72 BF 15 46 79 20 00 00 00 80 0C 00]
event = 0x3E (62, "LE Event")
LE_Event_Code = 0x1 (1, "LE Connection Complete Event")
Status = 0x00 (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 = "794615BF72B0"
Connection_Interval = 0x20 (32)
Connection_Latency = 0x00 (0)
Supervision_Timeout = 0xC80 (3200)
Master_Clock_Accuracy = 0x0 (0, "500 ppm")

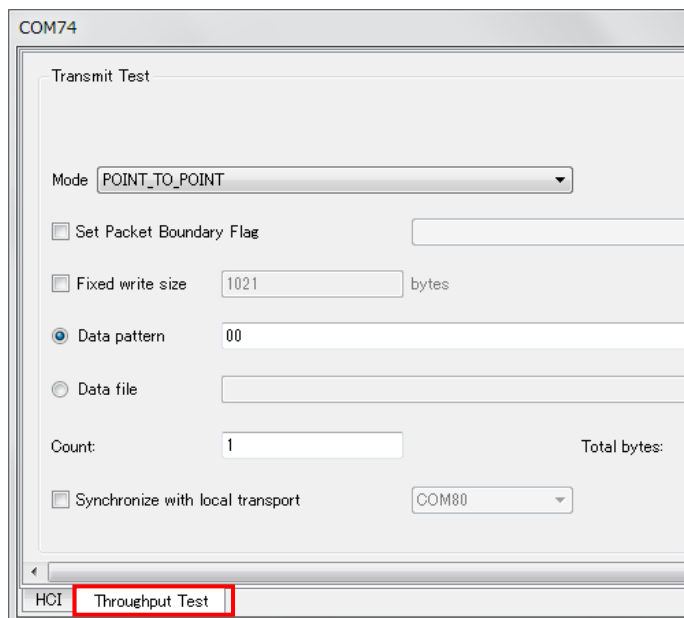
```

8.3. Communication Confirmation

A) Confirm the [Connection_Handle] of (1):EUT side.



B) Click the [Throughput Test] Tab.



- C) Change parameters according to the test.
D) Push the [Execute Test] button.

The screenshot shows the 'COM74 Transmit Test' window. The 'Connection Handle' is set to '0xC'. The 'Mode' is 'POINT_TO_POINT'. The 'Set Packet Boundary Flag' is 'START_NON_FLUSHABLE_PACKET (0x00)'. The 'Fixed write size' is '20' bytes. The 'Isochronous' checkbox is checked, and the 'ms interval' is '10'. The 'Data pattern' is '00 11 22 33 44 55 66 77 88 99 00 11 22 33 44 55 66 77 88 99'. The 'Count' is '200'. The 'Total bytes' is '4000(0xFA0)'. The 'Synchronize with local transport' checkbox is checked, and the port is 'COM80'. The 'Execute Test' button is visible.

- ✓ Connection Handle: Select the value of (1):EUT. (set by default)
- ✓ Fixed write size: Enter the data size.
- ✓ Isochronous: Set the transmission interval.
- ✓ Data pattern: Enter the data of same size as [Fixed write size] with space every 1byte.
- ✓ Count: Enter the repeat transmission count.
- ✓ Synchronize with local transport: Check and select the port number of (2):Facing machine.

- E) If you want to stop the test, push the [Abort Test] button.

The screenshot shows the 'COM74 Transmit Test' window after the test has been executed. The 'Connection Handle' is '0xC'. The 'Mode' is 'POINT_TO_POINT'. The 'Set Packet Boundary Flag' is 'START_NON_FLUSHABLE_PACKET (0x00)'. The 'Fixed write size' is '20' bytes. The 'Isochronous' checkbox is checked, and the 'ms interval' is '10'. The 'Data pattern' is '00 11 22 33 44 55 66 77 88 99 00 11 22 33 44 55 66 77 88 99'. The 'Count' is '200'. The 'Total bytes' is '4000(0xFA0)'. The 'Synchronize with local transport' checkbox is checked, and the port is 'COM80'. The 'Abort Test' button is highlighted with a red box. The test results on the right show: Enqueued: 1780(0x6F4), Sent: 1680(0x690), Elapsed time: 00:00:01.058, Avg. throughput: 12.7032 kbps, Min: 4.70588 kbps, Max: 13.3056 kbps, First byte time: 14:13:58.616, Last byte time: 14:13:59.640.

(END)